

Chemical Week

October 8, 1955

Price 25 cents



● Food Machinery's Trickett fits executive development plan to the man—not vice versa . . . p. 25

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● Asphalt to be filled before plastics are widely used in construction: statistical data p. 54

● Canada's problem: sulfur source and sulfur market—but they're far apart p. 81

● Polymers-researcher Osipow sees low-cost nonionic based on sugar; here's the process . . . p. 90





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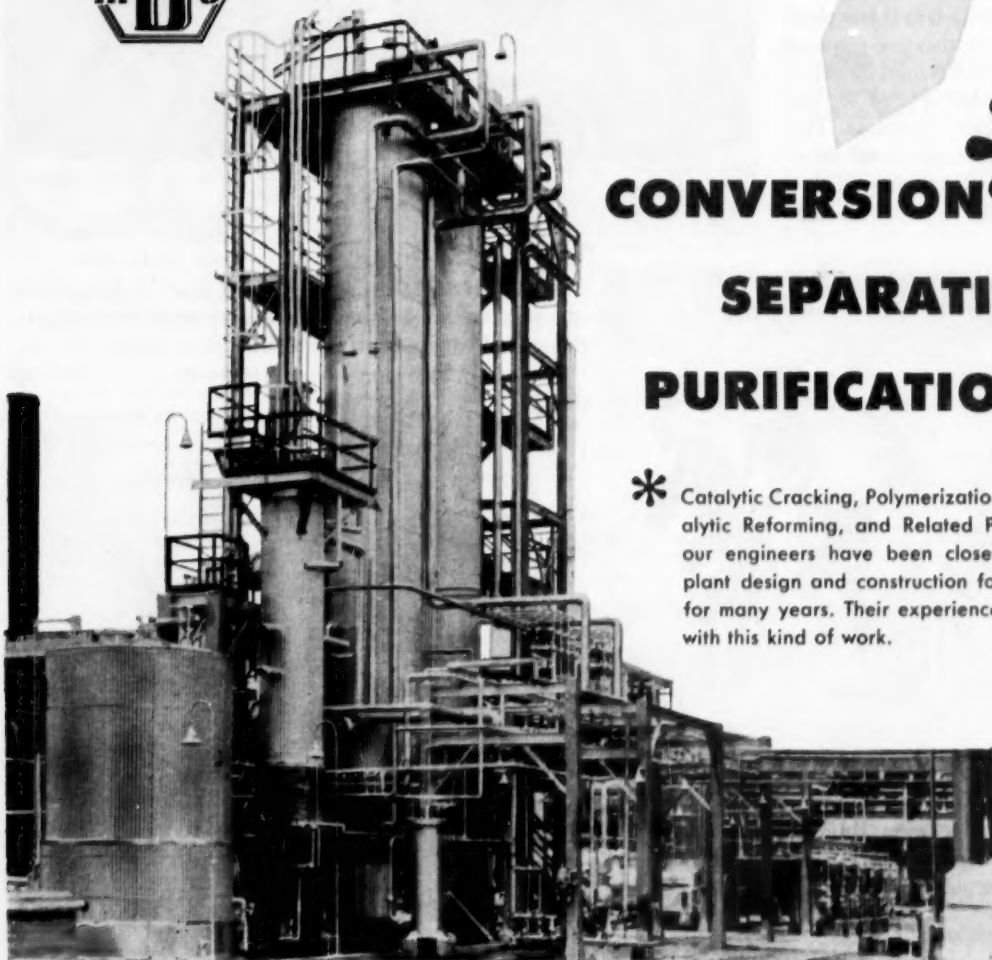
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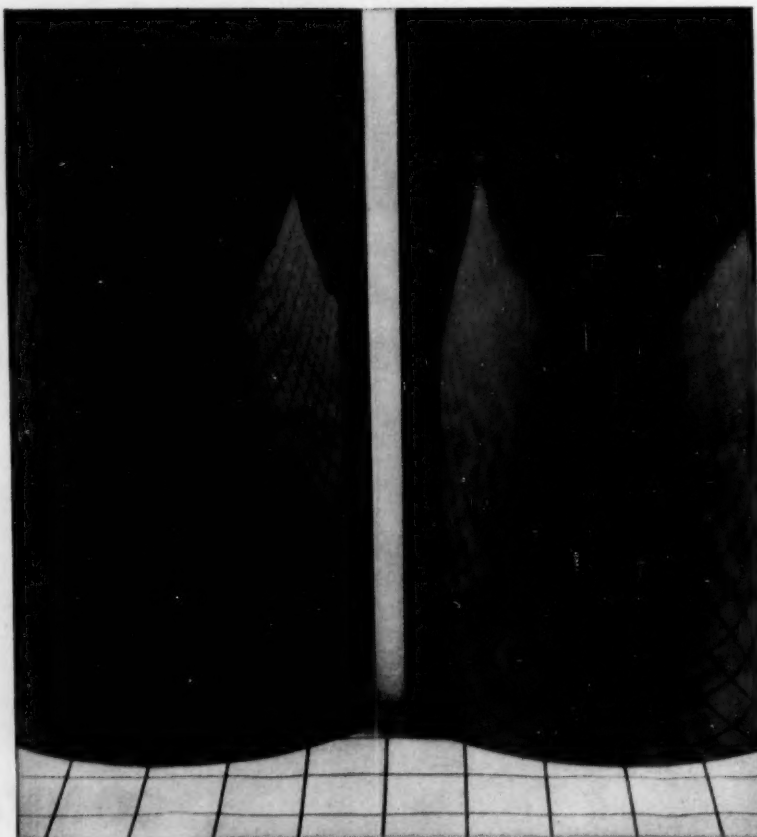
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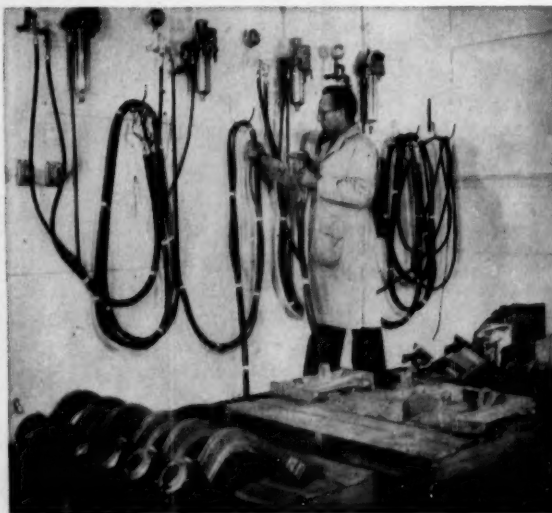
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Cellulose Products Department
HERCULES POWDER COMPANY
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CL55-5

TOP OF THE WEEK

Secrecy threatens industrial development of nuclear energy. That's consensus of experts congregated at Atomic Industrial Forump. 13

Foreign chemical workers are now more interested in cash than in socialist theory. The long-range trend could cause big shifts in foreign tradep. 30

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Chemical Week (including Chemical Specialties and Chemical Industries) is published weekly by McGraw-Hill Publishing Company, Inc. James H. McGraw (1860-1948), founder, Executive, Editorial and Advertising Offices: McGraw-Hill Building, 1221 Ave. of the Americas, New York 20, N. Y. Publication Office: 1300 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Paul Montgomery, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice-President, Publications Division; Ralph B. Smith, Vice-President and Editorial Director; Joseph H. Allen, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Circulation Director.

Subscriptions to Chemical Week are solicited from management men in the chemical process industries. Postage and company connection must be indicated on subscription order. Address all subscription communications to Chemical Week Subscription Service, 330 W. 42nd St., New York 36, N. Y., or 1309 Noble St., Philadelphia 23, Pa. Allow one month for change of address.

Single copies 35¢ except Annual Buyers' Guide issue priced at \$2.50. Subscription rates—United States and Possessions \$5.00 a year; \$8.00 for two years; \$10.00 for three years. Canada \$6.00 for a year; \$10.00 for two years; \$15.00 for three years. Other Western Hemisphere countries \$15.00 a year; \$25.00 for two years; \$30.00 for three years. All other countries \$25.00 a year; \$40.00 for two years; \$50.00 for three years. Second-class mail privileges authorized at Philadelphia, Pa. Copyright 1955 by McGraw-Hill Publishing Co. Inc.—All rights reserved.

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Casting Ti

TO THE EDITOR: In your "Target" ("Refractory for Cast Ti," Aug. 6), the use of a colloidal graphite coating on re-usable molds is ascribed to National Research Corp. We actually employ neither a colloidal graphite nor a re-usable mold . . . but would like to take this opportunity to outline the facts concerning our process . . . so far as we are able to present them in the light of commitments to licensees and pending U.S. patent applications . . .

The mold we employ is of a refractory type . . . can be produced employing conventional facilities and techniques. It is not ordinarily reused since complex shapes embodying cored holds and re-entrant portions make it necessary to destroy the mold in order to remove the finished casting.

Our process, which has the advantages of low surface contamination, soundness, smooth surface—together with economical methods of production of molds, offers flexibility in the selection of casting configuration.

This would not be true in a permanent mold type of process.

JOHN H. DURANT
Business Manager, Research Division
National Research Corp.
Cambridge, Mass.

Of 'Ivory Towers' . . .

TO THE EDITOR: With research currently costing nearly \$4 billion/year, contemplation of ways to make it more productive certainly seems worthwhile. Accordingly, I was much interested in your feature report on creativity in research (July 23).

In the belief that there is room for much discussion of this complex subject, these views are submitted for consideration—with some reservations, however; for almost any statement on research method is highly controversial. This is particularly true if the argument is bluntly stated and not supported by case histories.

It is almost self-evident that the primary goals of research are (1) to gain an understanding of our environment and (2) to learn how to control it. Thus we need scientific knowledge (understanding) and technological

know-how (control). Of these, the latter is the ultimate objective insofar as humanity in general is concerned.

Unfortunately, there is a common belief that the basic understanding must come first, technology later. Thus it is often said that "fundamental research leads the way" or that "we need more basic research to assure a store of new information on which later inventions will be based." It has even been claimed that we should have more "ivory towers," wherein the researcher can be . . . unencumbered by practical considerations.

Fallacies to Resolve

There are certain fallacies here that are not easily resolved. For it is true that in many instances, basic research has resulted in new information that was later put to practical use. Yet there are just as many cases where practical applications came long before the basic understanding; Valko* cites indigo vat dyeing, where the full scientific explanation was attained 2,500 years after the process was developed. Let it be argued that the textile field is old and under-researched, we might cite photography as a much newer field (about 70 years old) wherein technology has outstripped science, despite considerable basic research.**

Probably the best progress is made where theory and application evolve side by side, each contributing to the development of the other. This was recognized by Lord Rutherford†, who said that "long-term research and *ad hoc* problems form an indivisible whole." A recent example is the development of the transistor; Bown†† says, "In this effort we had the traditional motivation and method of scientific research intermingled with the motivation and method of the inventor. The scientist seeks to know and to explain; the inventor is alert to apply. In combination they can create promptly and soundly the new things that their work has made possible. The purity and integrity of science are in no sense stultified by the immediacy with which it is translated to human service."

Mental Processes

Another consideration involves the mental processes of the researcher. There is a type of mind that is con-

tent with devising and proving theories that explain known facts. (Perhaps the main difficulty with the "ivory tower," incidentally, is that the rarified atmosphere is conducive to the propagation of this species.)

Such an individual may be strong in analytical ability, but weak in the ability to associate and integrate ideas in a creative manner. Yet he sometimes disguises this through a clever device: having started with a known fact, worked out an explanation, and garbed it in highly mathematical terms, he presents the mathematics first, deduces the explanation, and predicts the fact. To the uninitiated, it may appear that something has been discovered. Yet well over 75% (unofficial estimate) of all basic research studies merely explain, or measure more exactly, phenomena that were already clearly recognized, without aiding in any way the prediction of new facts. Such research may have high scientific value, but there is some question as to how productive it is.

In a large organization it is possible to utilize the services of men of both traits—analytical and associative—so that each will supplement the other, to their mutual benefit. Even so, I believe that it will some day be recognized that the most productive men, including the pioneers in every field of science, have been men who were strong in both traits.

Spectrum of Methods

Another unfortunate misconception involves research method. Anyone with a problem to solve cannot afford to be inhibited in his choice of an approach; he cannot always use an "elegant" method. Too often research methods have been classified as either fundamental (and therefore good) or empirical (bad). Actually there is a spectrum of methods, one shading into the other.

- Trial-and-error (very empirical).

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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Trial-and-error . . . has solved many a practical problem. However, it is slow and uncertain. Moreover, the solving of one problem by this method gives little or no insight into the solution of the next. Nowadays such research is frowned on, and rightly so.

At the opposite, most erudite end are studies of reaction mechanisms, kinetics, steric relationships, etc. Results may indeed be useful, particularly for extending a discovery that has already been made. But too often the work is carried beyond the point of diminishing returns by a researcher of analytical frame of mind who is more interested in merely measuring something, or in proving that a theory is really true, or in obtaining data for a publication, than in creating something. Nowadays such research is frequently overrated; its creative value is sometimes a mere illusion based on clever reporting.

These extreme approaches—trial-and-error and mechanism studies—might be regarded as high, rocky hills whereon the sowing is difficult and the crops are sparse. There is a fertile valley between, which—in my opinion—produces the bulk of our research harvest. On the one side, near the "trial-and-error hill," is a "study of variables" area. Here the effect of all controllable variables is systematically determined. While it must be regarded as an empirical method (*even in cases where chemical composition is one of the variables*), such an approach is often the best way to begin on a completely unfamiliar problem. Once a few facts have been uncovered, however, the researcher can make faster progress on the other, "working hypothesis," side of the valley. Here he uses his insight to guess at the underlying principles, and—assuming his hypothesis to be true—uses it to predict the proper steps toward a solution of the problem. (As long as it gives him the results he wants, he is not immediately concerned as to whether the hypothesis be true or false.) Years later, the fellow in the "ivory tower" on "mechanism hill" can prove that he was right—or maybe wrong.

Going a step further, a researcher with an associative mind, a good memory, and wide experience can

often integrate his new hypothesis with several previously acquired bits of information and come up with some entirely new concepts, or solutions of old problems, or almost anything imaginable. In my opinion, this is research in its most creative form.

There are no clear-cut dividing lines between the four research methods. We might say, arbitrarily, that the first two are empirical, the last two are fundamental. But *in the hands of a capable researcher, armed with a fertile imagination, skilled in inductive reasoning and in the setting up of working hypotheses, and fired with ambition to solve a problem, there is usually no distinction between the part of his work that is fundamental and the part that is empirical.*

Columbus and Perkin

To show the value of a working hypothesis, take as a homely example the story of Columbus: when it occurred to him that the earth is round, he did not try to set up instruments or invoke higher mathematics to prove that it must be so. Accepting his hypothesis as true, he concluded that he should be able to reach India by going westward. It is this ability to visualize and put to practical use a tentative theory, no matter how nebulous, that distinguishes a creative researcher from one who has his eyes turned toward proving what to his more imaginative fellows has long since appeared fairly obvious.

That Columbus discovered America instead of reaching India is beside the point; such chance discoveries, often more important than the goal being sought, are an added incentive to the diligent pursuit of an objective. Perkin's synthesis of the first aniline dye, while attempting to make quinine, is a classic example. Although no study of the subject has been reported, it is likely that most accidental discoveries have been made by those who were following a hypothesis in an attempt to produce a practical result, rather than merely trying to confirm it.

This entire problem of research objectives, research methods and research mentalities is a complex one. It is all too easy to become involved in semantics, and to confuse the need for basic, scientific understanding (a research objective) with what is often

called basic or fundamental research, but which refers to a method (such as mechanism studies). My thesis is that (a) sometimes science leads the way, and sometimes technology; but the best progress is likely to be made where science and technology evolve side by side, each nurtured by and inspired by the other; that (b) the type of mentality that combines associative and analytical traits is likely to be the most creative; and that (c) while any research approach can on occasion be productive, the most creative researcher cares little whether his methods are empirical or fundamental, and in most cases employs an almost indistinguishable combination of both.

Admittedly, however, the subject is a controversial one that deserves much further consideration and discussion.

A. C. NUESSELE

Head, Textile Applications Laboratory
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- * E. I. Valko, *Textile Res. J.*, 22, 213 (1952)
- ** W. F. Berg, *Sci. Monthly*, 80, 163 (1955)
- † Lord Rutherford, quoted by C. M. Whitaker, *J. Textile Institute*, 44, 237 (1953).
- †† R. Bown, *Sci. Monthly*, 80, 40 (1955)

DATES AHEAD . . .

Assn. of German Plastics Trade "Plastics 1955" trade fair and production exhibition, Dusseldorf, Germany, Oct 8-16.

Canadian Agricultural Chemicals Assn. annual meeting and conference, The Chantecler, Ste-Adele-en-haut, Que., Oct 13-14.

American Gas Assn., annual convention, Los Angeles, Oct. 17-19.

National Safety Council, exposition, Conrad-Hilton Hotel, Chicago, Oct 17-21.

American Dietetic Assn., annual meeting, St. Louis, Oct. 18-20.

National Assn. of Corrosion Engineers, South Central regional meeting, Shamrock-Hilton Hotel, Houston, Oct. 18-21

Atomic Energy Exposition, United Nations Plaza, New York, Oct. 20—Nov. 3

International Congress of Industrial Chemistry, Madrid, Spain, Oct. 22-31

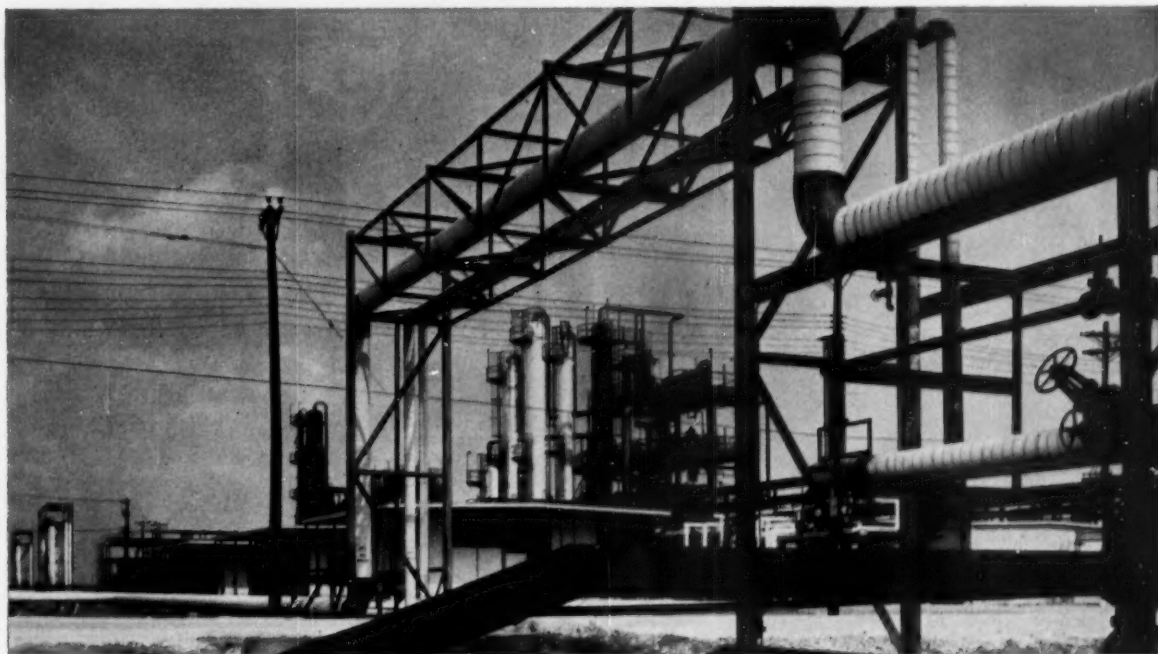
National Conference on Standards, Sheraton-Park Hotel, Washington, D.C., Oct. 24-26.

Salesmen's Assn. of the American Chemical Industry, 4th annual sales clinic, Roosevelt Hotel, Oct. 24.

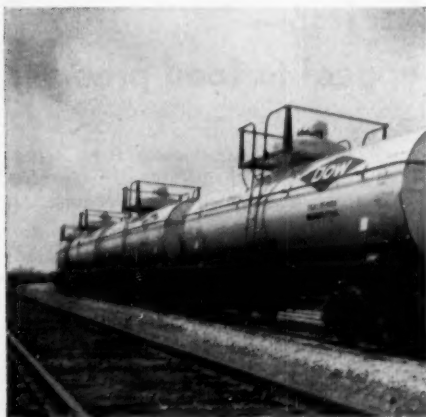


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Business

Newsletter

CHEMICAL WEEK

OCT. 8, 1955

Despite a double-barreled blow—President Eisenhower's heart attack (which sent stock prices tumbling) and withdrawal of government tax amortization support—the chemical and allied products industry will go ahead with heavy capital investment programs.

Reflecting confidence not only in the long-run political picture but also in the economic outlook over the next decade, chemical producers claim they will go ahead on schedule with all current expansion plans—"as if the past week's events had never occurred."

Leading the way is Goodyear Tire and Rubber Co.—which says it will spend \$3.5 million to increase chemigum and resin capacity at Akron and will invest an additional \$2.5 million to raise output of its Airfoam units.

Also slated to receive a cut of the company's over-all \$100-million expansion program are chemical facilities at Niagara Falls, N. Y., which will be expanded at a cost of \$500,000.

Kaiser Aluminum and Chemical Corp., despite federal withdrawal of assistance for expansion of the aluminum industry, will also go ahead as planned. Its fabricating plant at Ravenswood, W. Va. (now under construction), will suffer no cutback as a result of the government decree; production is expected to start sometime in mid-'56.

Kaiser Steel is likewise bullish for the long term, will exercise its option for the immediate purchase of vast limestone deposits in southern California. The 10-square-mile area (known as the Cushenbury deposit) lies in San Bernardino County, 30 miles southeast of Victorville, will enable Kaiser to become self-sufficient in three basic raw materials—iron ore, coking coal, and limestone.

The deposit is also due to become a source of limestone for Permanente Cement Co., which is currently building additional cement-producing units in California.

Newport Industries, Inc., which for many years has operated a steam distillation plant at Pensacola, Fla., for recovery of pine tar products from stumps, is branching out, too, will build a new plant near Telogia (in Liberty County), west of Tallahassee. Cost: as yet unrevealed; estimated date of completion: late '56.

Alaska Pine (and affiliated Rayonier, Inc.) may have touched off a new silvichemical era in British Columbia with ground-breaking ceremonies for an initial \$1-million unit of a plant to provide the oil industry with chemical dispersants for drilling muds (*CW*, May 21, p. 16).

Made from hemlock bark, Alaska Pine's new product (called Rayflo) is designed to replace imported materials, thus cutting drilling costs. Initial production is scheduled for spring '56.

Richmond Exploration Co. (a subsidiary of Standard Oil Co. of California) will build a \$4-million asphalt refinery in Maracaibo, Venezuela.

Construction starts immediately; production is scheduled to begin next August; capacity is 10,000 bbls./day.

Business Newsletter

(Continued)

Two developments late last week in the rapidly changing titanium production picture:

- National Lead Co.—with discovery of new large deposits at its properties in Tahawus, Essex County, New York, and purchase of large tracts of titanium-bearing land in north central Florida—is off and winging. Its subsidiary, Canadian Titanium Pigments, Ltd., it's reported, will definitely go ahead with plans to build a \$15-million titanium pigment plant in Quebec.

- Meanwhile, however, Pittsburgh Plate Glass' plan to form a new subsidiary (with Britain's Imperial Chemical Industries) to build a \$10-million titanium metal plant seems to have fallen flat.

Pittsburgh Plate executives had admittedly expected that the U.S. government would sign a take-all-production contract for the next five years; now that hope has virtually disappeared.

British Columbia's Consolidated Mining and Smelting Co. may have a competitor—if reports from London prove true.

Reliable sources there now claim that Base Metals Mining Corp., Ltd. (headed by Franklin Roosevelt, Jr.) is planning the construction of a multimillion-dollar zinc-lead smelter near Field, B. C.

Base Metals (head office, Toronto) owns the original Monarch and Kicking Horse mines at Field, also controls the Cork-Province mine and Vancouver Island Base Metals, Ltd.

Reminders were mailed last week to all prospective buyers of the last of the government-owned synthetic rubber plants (at Institute, W. Va.) that bids will close on Oct. 7. Over 20 tenders have already been received, Disposal Commission members say, from leading U. S. companies and foreign firms.

There's a dramatic struggle being waged inside the West Germany Parliament these days as to whether West Germany will be a nation of cartels or one of "free enterprise."

Federal Economics Minister Ludwig Erhard, champion of American-style free economy, is leading the fight for an anticartel law. He's meeting rugged undercover opposition, though—much of it from powerful West German chemical firms, which have long held that a return to the prewar system is a matter of vital necessity to German economy.

The issue should come to a head within the next few weeks on the floor of the Bundestag (lower house). Outlook now is for a compromise law, with cartels to be permitted to operate under a number of severely restricting provisions.

Italy may soon have a network of rainbow-tinted highways, thanks to the discovery of a process that, it's said, will permit production of multi-colored asphalt. Beside its obvious aesthetic appeal, the new asphalt is reported to be six times more durable and costs no more to make.

Celebrating a 60th birthday last week was a mixed pleasure for executives of Virginia-Carolina. In addition to a continuing mystery as to why the company's stock has been climbing, they encountered strong criticism (at a stockholders' meeting) of the stock option plan now in use. On both scores: an official "no comment at this time."



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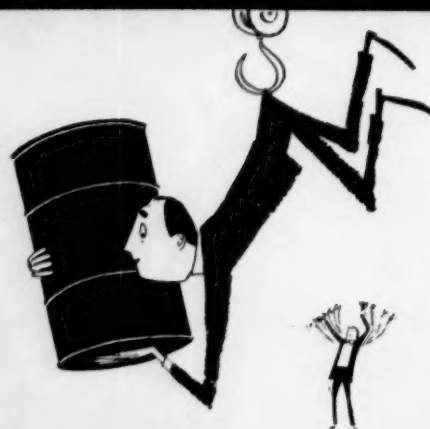
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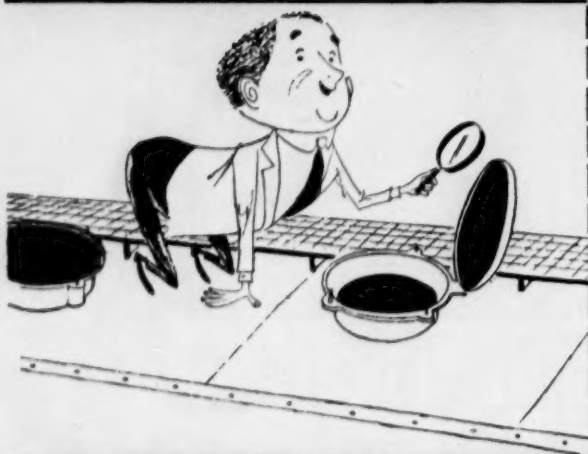
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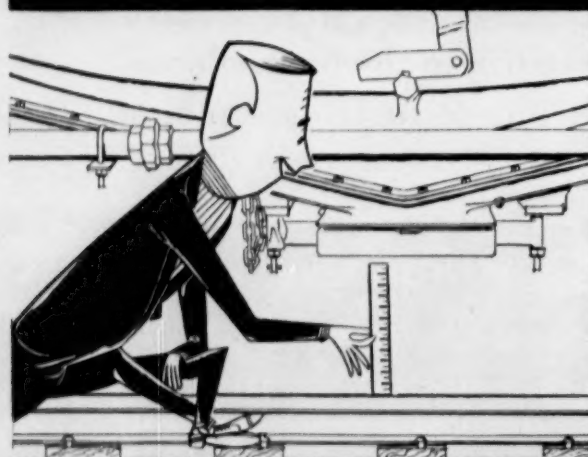
No sanitation problems in transit



No packing, racking or stacking



Far more clearance for unloading



Bulk shipping of dry, granular and powdered products in General American Airlide® Cars is safer, easier—and costs less!



Over 1000 Airlide Cars now in service or on order. A small blower is all you need to unload cars into any conveying system. Write for bulk shipping information on your products.



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AIRSLIDE CARS—now successfully shipping flour, semolina, sugar, starch, plastics, chemicals and other products.

BUSINESS & INDUSTRY



FORUM: Over 700 delegates came to a three-day meeting on . . .



Commercializing the Atom

At a panel-packed, four-star meeting in Washington's Sheraton-Park Hotel last week, U.S. industry heard an impassioned plea from the country's top atomic experts.

The United States, they agree, still seems to be generally ahead of Russia in peacetime applications of atomic energy but has no margin for complacency. Judging strictly from what the Russians showed at the recent Atoms-for-Peace Conference in Geneva, U.S.S.R. progress in biology, general instrumentation, and industrial applications "is not unimpressive."

This means, they conclude, that the U.S. must withdraw (and soon) the veil of secrecy still hanging over atomic energy information; individual companies must strive for a cross-fertilization of ideas to enable the U.S. to drive ahead.

Just Around the Corner? Publicly as well as privately, most conference speakers agree that forecasts made only last spring were too pessimistic as to when industrialists can expect atom-

ic-generated electric power. Atomic power cost, they say, is getting cheaper and cheaper—on paper at least.

"We have plans now for an atomic power plant that would be competitive in the New England area," says Donald Kallman, nuclear economist with Babcock & Wilcox. B&W has already contracted to build a \$55-million partly-atomic station for Consolidated Edison of New York—due in operation by 1960.

Chief drawback to extending operations is the continuing government monopoly on processing of ores and ore concentrates into metallic uranium fuel materials. "If we could lick just this one thing," maintains Catalytic Construction's Wilbur Kelley, "private industry could make some realistic estimates on just what atomic power costs will be."

Kelley further urges that processing be thrown open immediately to normal, competitive development. "The alternative," he warns, "is to lose the

margin of advantage the U.S. still holds over other nations."

General Electric's Francis K. McCune agrees. The European market for peacetime atomic products is wide-open right now, he says. But U.S. secrecy and security regulations stand in the way of exploiting this rich potential.

Most U.S. companies (including a number of chemical firms) came back from Geneva with prospects of major sales in the European market. GE, for example, has in hand right now several requests to submit proposals for reactors—varying from research to large power installations.

But it can't take advantage of the very thing that might give the U.S. atomic industry (and, indirectly, industry in general) the shot in the arm it needs.

Echoes Everywhere: This was, in brief, the tenor of opinion among more than 80 representatives of industry, labor and education who spoke at 14 separate forum sessions.

The atomic power business offers no bonanza to investing companies today. However, the moment has arrived



FORUM, INDUSTRY LEADERS* urge U.S. push peaceful use of the atom.



SPECIAL PROBLEM PANEL† takes up training problems, legislating atomic health and safety.

when chemical companies (or any other segment of U.S. industry vitally dependent on power) must decide whether to accept the risks involved—and get into the program on a long-term investment basis—or face the possibility of being passed in the international race.

Example of what some companies have done, however, was shown at the U. S. Trade Fair of Atomic Industry—held also at the Sheraton-Park.

More than 70 U.S. and foreign industrial firms offered exhibits (see p. 13)—with a score of the country's leading chemical concerns in evidence.

"But," as one leading chemical producer was overheard to say, "the movement hasn't spread out widely enough.

* Left to right: Walker Cislcr, president of the Atomic Industrial Forum; Frank Parker, American Radiator and Sanitary Corp.; Charles Robbins, AIF; Oliver Townsend, AIF; Alex Stewart, National Lead Co.; Herbert Miller, AEC; Bruce Old, Nuclear Metals, Inc.; John Childs, Irving Trust.

† Left to right: C. F. MacGowan, AFL Boilermakers; Monroe Potcher, of Potcher, Schluskel & Katcher; Ralph Morgen, Purdue Research Foundation; Joseph Boyce, Argonne National Laboratory; A. H. Holland, Food & Drug Administration; Frank Parker, American Radiator.

"Much of the initial terror has gone out of the atom, but many smaller firms aren't convinced it's time for them to move yet. They're holding back, and as a result they're missing their golden opportunity."



NUMEROUS EXHIBITS grace the first U.S. Atomic Trade Fair.

B & I

Of Men and Machines

Will increasing automation in chemical and other industrial plants put people out of work, or will more automation result in more jobs?

This question has come into peak prominence this year following pronouncements by labor union leaders and rebuttals by industrialists, and now Congress is about to get in on the data-flinging debates.

What will be the first broad-gauge Congressional investigation of the increasing use of automation in industry gets under way next week. And on at least two days during the Oct. 14-28 hearings, the investigators will be looking at the chemical process industries in particular.

Patman to Preside: This fact-finding study has been scheduled by a subcommittee of the Joint Senate-House Economic Committee, which has become convinced of the subject's importance to the national economy. Presiding at the hearings will be Rep. Wright Patman (D., Tex.); other members of the subcommittee are Senators Joseph O'Mahoney (D., Wyo.) and Arthur Watkins (D., Wyo.), Representatives Augustine Kelley (D., Pa.) and Jesse Wolcott (R., Mich.).

Among the witnesses on chemical industry aspects:

- Thomas Walsh, professor of chemical engineering at Case Institute of Technology, and director of the chemical group in the institute's automation project. Walsh formerly worked with Standard Oil of Ohio.

- Otto Pragan, director of research and education for the International Chemical Workers Union (AFL), a labor economist.

In addition to witnesses who'll discuss particular segments of U.S. industry, several general witnesses are expected to appear. Among them: Walter Reuther, president of the CIO; Edwin Nourse, who served as chairman of former President Truman's council of economic advisors; and Vannevar Bush, president of the Carnegie Institution of Washington, who headed the Office of Scientific Research & Development during World War II.

Other material for the probe: results of Labor Dept. studies of a series of case investigations of effects of automation in various kinds of plants.



PARKE, DAVIS, and DEWEY and ALMY: Among a dozen chemical companies operating plants in Argentina . . .

Caught in a Nationalistic Backwash

Though relieved this week by the abrupt resignation of Argentina's Juan Peron, U.S. chemical industries aren't out of heavy water yet.

In recent years, Peron had been converted into a champion of maintaining good relations with the U.S. Thus the revolutionary government will now be forced to crack down on all foreign interests to abate the counterwave of super-nationalism.

Argentina's political upheaval, for the moment at least, is a doubtful victory for U.S. chemical companies. For some years now, they have been unable to call back earnings from Argentine properties into the U.S., have been forced instead to plow funds back in the hope that someday the political air would clear, enabling the transfer to be made.

But that possibility now seems as remote as ever. The outlook for any kind of a transition to peaceful economic relations is slim; company executives seem sure to face even more vigorous anti-American sentiments in the months ahead.

Ironical, at Best: Reason for this situation goes back to the sudden switch in Peron's tactics relative to U.S. investments over the past few years. During most of his tenure in office, Peron admittedly gave the U.S. government more than a little trouble in economic and commercial fields.

But eventually, thanks to a happy combination of U.S. diplomacy and

severe internal and external pressures, his anti-American sentiments were assuaged. Peron was the leader in the fight for the Standard Oil of California oil contract; it was he who backed a liberalization on profit remittances and clinched negotiations for Export-Import Bank \$60-million steel loan.

Reversal of his prior policies was so marked that earlier this year one of the chief opposition charges against him was that he was "too American."

The more nationalistic elements of the Lonardi government aren't apt to overlook this charge now—particularly in view of the fact that their revolutionary fervor will take some time to cool off. Argentine Army officers, moreover—who traditionally have little understanding of economic realities—are now in control.

Optimism Remains: Despite all these discouraging factors, however, most chemical companies say they're sure the Peron deposition is a step in the right direction. Typical is the comment of a leading drug manufacturer this week: "Peron wrecked the econo-

my of a very rich nation. Things couldn't get much worse; any change has to be a change for the better."

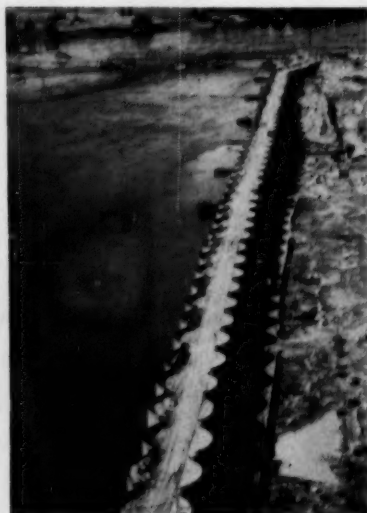
Ferro Corp.'s board chairman, Robert Weaver, agrees, says, "Just about any change in Argentina will help." The company's plants, he goes on, were not damaged in the revolution, and though it realizes that it may take a decade or two to recover, Ferro Corp. has great expectations for its investments in Argentina.*

Parke, Davis's pharmaceutical laboratory in Buenos Aires likewise escaped damage in the recent hostilities; earnings in the first half of 1955 were running over \$500,000. And though company executives aren't hopeful of transferring profits to the U.S. immediately, they think that the possibility may be realized once the current excitement dies down.

Sterling Drug Co., one of the U.S. chemical industry's heaviest investors in Argentina (with \$3 million in plants and equipment), is also bullish for the long-term outlook. And St. Joseph Lead (with a lead and zinc mine that produces about 600 tons/day of ore, and with interest in a sulfuric acid plant) "has every confidence that the situation, though still discouraging, will work itself out eventually."

Only real difference of opinion among these (and other) chemical makers is when that break will come.

* Gathered under a subsidiary, Ferro Enamel, S.A., with fixed assets of \$300,000, annual sales of \$1.5 million.



HARNESSING A RIVER: Across U.S.-Canadian border, cofferdam is . . .

Big Start on Big Job

Scurrying to get lots of earth-moving out of the way before the winter freeze, operators of bulldozers, draglines and dumptrucks this week are already well along in initial work on two St. Lawrence River projects that are expected to mean big things to chemical process companies in both the U.S. and Canada.

Separate but related, these projects—the long-debated Seaway and the hydroelectric power dams—are simultaneously moving ahead toward their 1959 completion dates. The fast start on these big jobs is a nudging reminder to any process companies that have lagged in laying plans to take advantage of these projects or to keep up with competitors that will be using them.

Eager to publicize new industrial opportunities in the "North Country," the New York State Dept. of Commerce and the St. Lawrence Valley Assn. of Chambers of Commerce last week sponsored a tour of the area from Massena (60 miles upstream from Montreal) to the Thousand Islands.

Expansion Predicted: A great new era of industrial expansion and prosperity is in store for this area, says Gov. Averill Harriman; but it will take "initiative, hard work, and the use of natural resources that have not been fully utilized."

One firm already signed up for

some of the torrents of power to be developed by the new dams: Aluminum Co. of America, which has contracted for 174,000 kw. of firm power and 69,000 kw. of interruptible power for 38 years, subject to the right of the New York State Power Authority to reduce those energy deliveries after 28 years.

The power going to Alcoa will represent only one-fourth of total power to be generated by the St. Lawrence hydro stations. Their annual output—13 billion kwh. of low-cost electric energy—will be about three times that of Hoover Dam.

Seaway work is also concentrated in the International Rapids section of the river, where rapids are principal obstacles to deep-water shipping, which—after the new channels are ready for traffic—will be able to haul chemicals and other freight between the ocean and the Great Lakes for about one-seventh of railroad rates.

COMPANIES

Koal-Krudes, Inc. (Spokane, Wash.) has been organized to recover coal char and creosote from low-grade coal, using a process owned by the PDP Co. (Lewiston, Idaho).

The firm plans to start construction soon on a \$200,000 plant at Monarch, Wyo., processing 250 tons/day of coal.

Vanadium Corp. of America will exercise an option to purchase a large manganese mining concession in Northern Rhodesia.

The concession, to be called the Bahati Mines, was purchased from the Weedon interests of Johannesburg, covers more than 200 sq. miles.

Texas Eastern Transmission Corp. has signed a contract with the Mexican government (and its oil and gas monopoly, Petroleos Mexicanos) for the purchase of 100-200 million cu.



New Pact for One-Man Union

AS COMMITTEEMAN for the AFL Electrical Workers unit at the atomic energy plant operated by Brush Beryllium Co. at Luckey, Ohio, Jack Rippke (left) signs new wage pact with Charles Pogan,

assistant director of personnel at the plant. As shop steward, he'll help see that the terms are adhered to. And as the only member of the unit, he'll do all the work, collect all the wages, pay all the dues.

Washington Angles »

» **Glycerine may be only the first** of several chemicals on which the government will give new expansion encouragement. The 27% boost in glycerine capacity for which makers can now get fast tax write offs was a test case.

Chemical mobilizers are now preparing figures for the Office of Defense Mobilization to show substantial war deficits on a half-dozen more chemicals with similar direct defense uses. Reportedly included: benzene, toluene, phosphorus, sodium chlorate, and ammonia.

» **ARE U.S. para-amino salicylate producers** being hurt by imports? The Tariff Commission is going to find out. For the record: Sumner Chemical Co. is the actual appellant, has asked for an investigation under the Tariff Act escape clause. Its charge: para-amino salicylate tariffs were almost halved in 1951 (to 3.5¢/lb. plus 25% ad valorem), have injured its business.

At the same time, the Tariff Commission is hearing testimony from U.S. fluorspar producers seeking protection from increased Mexican imports.

» **Antibiotic and pesticide content** of milk is scheduled for a study by the Food & Drug Administration. A nationwide, 1,600-sample survey is planned to find out how prevalent such residues are. Possible result: a new enforcement program.

» **Olin Mathieson's Don Ward** heads a powerful transportation group that will ask repeal of the 3% freight rate tax. The National Conference for Repeal of Taxes on Transportation contends that such taxes were originally approved to discourage traffic during World War II, should be ended now. But odds are against such a cut.

» **Want a research lab tax write-off?** You can still get one if the work you plan to research is directly tied to some commodity on which tax write-offs have been granted. Dow Chemical last week got a 47% write-off on a \$1.4-million facility at Midland. But Carbide's Bakelite Division was denied an application for an \$8.7-million Middlesex County, N.J., lab.

» **Expansion of manganese extraction research** is now advocated by a senate interior subcommittee on minerals, which, at the same time, criticizes Interior's off-again, on-again research policies. As a result of the double move, companies with manganese extraction research projects under way may stand a good chance to gain government contracts.

ft. of natural gas daily over the next 20 years.

Initial price to Texas Eastern: 14.2¢/thousand cu. ft.; the gas (to be supplied from 3 of Mexico's 22 gas-producing fields in the northeastern section of the country will be processed for export at Pemex's new \$80-million absorption plant at Reynosa.

• **Stockholders of Scott Paper Co.** have given the green light to an increase in company common stock—from 10 million to 40 million shares—and have also voted to increase Scott's debt limit from \$50 million to \$150 million.

Major financing will take place next spring, but no decision has as yet been reached as to whether the company will seek additional funds through a bank loan, debt securities, or convertible debentures.

• **Shareholders of Canadian Industries (1954) Ltd.** voted at a special meeting held last week to drop the 1954 from the company's corporate name. The change is now subject to supplementary letters of patent by the Secretary of State for Canada.

EXPANSION

• **Explosives:** Du Pont Co. of Canada, Ltd., will immediately start construction of a \$7-million commercial explosives plant in West Ferris Township, North Bay, Ont. Initial production is scheduled to start within 15 months.

• **Butadiene:** Firestone Tire and Rubber Co. has placed a contract with Catalytic Construction Co. for design and construction of a 40,000 tons/year butadiene plant.

Also due for expansion: Firestone's synthetic rubber plant at Akron, O., which will increase capacity 35%.

This, in addition to a 50% increase in production at the company's Lake Charles, La., plant, will bring Firestone's total annual synthetic rubber capacity up to more than 190,000 tons/year.

• **Cement:** Penn-Dixie plans to spend \$4.5 million to enable its West Des Moines, Iowa, plant to produce 2,340,000 bbls. of cement annually.

• **Sulfur:** Houston Gulf Sulphur Co. has started exploration and evaluation

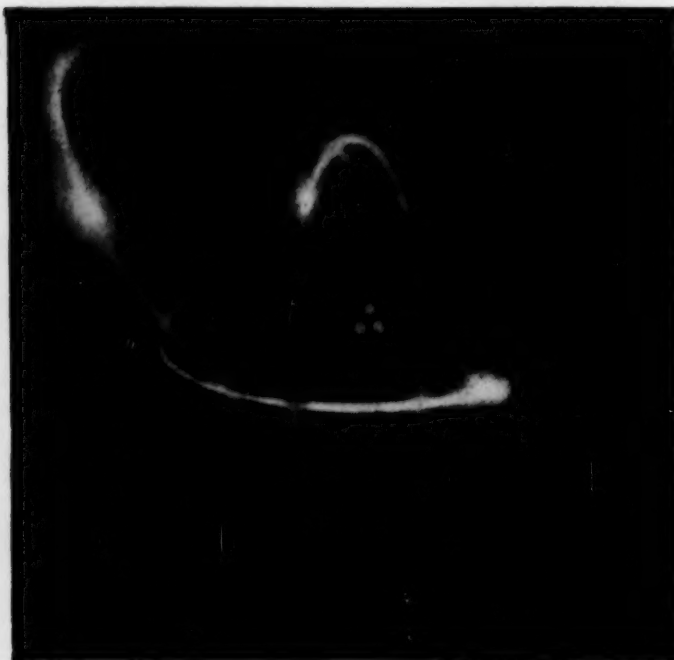
operations at its sulfur leases on Humble Dome, in Harris County, Tex. J. G. Whitney, former executive vice-president of Eastern States Petroleum Co. and Mexican Gulf Sulphur Co., is president of the recently organized firm.

• **Chemical Cellulose:** Rayonier Inc. will start construction at Jesup, Ga., of a 100,000-tons/year chemical cellulose plant. Cost: \$25 million; estimated completion date: late 1957.

When in operation, the new facilities will push Rayonier's annual capacity of chemical cellulose to over 900,000 tons.

• **Polyvinyl Alcohol:** Shawinigan Resins Corp. has started revision of its Indian Orchard, Mass., facilities in preparation for a multimillion-dollar polyvinyl alcohol plant.

Although a construction contract has not yet been let, Shawinigan is moving a railroad siding, and is placing raw material pumping facilities in a different location to allow room for the proposed new units. Ground is scheduled to be broken in early November.



CATALYST OF INDUSTRY

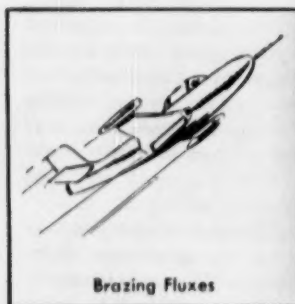
LITHIUM

the Miracle Element

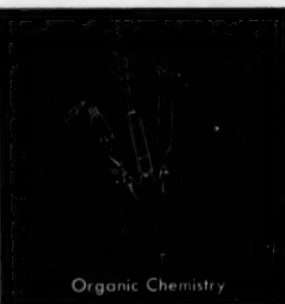
cat'a-lyst: chem., the causing or accelerating of a chemical change by the addition of a ... (catalytic agent) ...

From air conditioning to welding fluxes, Lithium chemicals are the catalysts of industry. Multi-purpose greases, porcelain enamels, organic chemicals, pharmaceuticals, electric storage batteries, heat treating, glazes, electronic ceramics, metallurgy, brazing fluxes—all boast products made better by the addition of Lithium. Architectural porcelain enamels, porce-

lainized aluminum, low temperature heat treating, cermets, deicing of parked aircraft—these are wholly new fields with an interest in Lithium. Why don't you consider the possibilities Lithium offers for your production process? Investigate the profit potentialities of this wonder metal. We will be glad to discuss it with you.



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CHEMICAL PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minnesota

Charting Business

CHEMICAL WEEK

OCT. 8, 1955

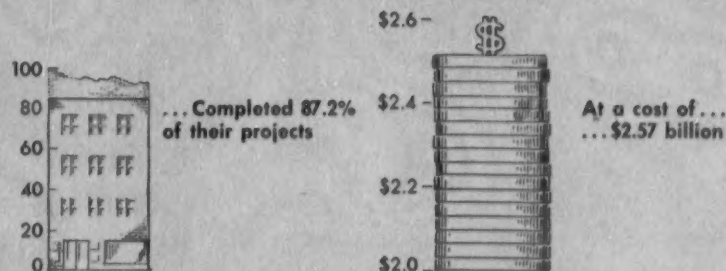
FINAL SCOREBOARD SHOWS...

(on projects granted quick tax write-offs)

	Number of certificates	Total cost (in millions of dollars)
Chemicals and allied products	1,040	\$2,952
Primary metals	1,654	5,240
Petroleum and coal products	575	2,447
Pulp and paper	122	852
All manufacturing	12,704	\$15,401

*That's 8.2% of all manufacturing certificates
14.4% by dollar volume*

Of the Total, Chemical and Allied Industries Have...



Source: Office of Defense Mobilization, covering certificates authorized through Sept. 30, 1954

With the door virtually slammed on the prospect of many more tax write-offs for chemical process facilities, executives can now tote up the scorecard.

By dollar volume, chemical and allied products' companies received 14.4% of

all rapid amortization certificates granted; in total number of write-offs, their percentage "take" was 8.2%.

Of the total grants, 87.2% are in place (and in operation) today; 7% should be completed by mid-1956.

ON THE LABOR FRONT...

For every 5.13 newly hired plant workers...



Source: Bureau of Labor Statistics

... Chemical process companies are now taking on 2.73 salaried employees

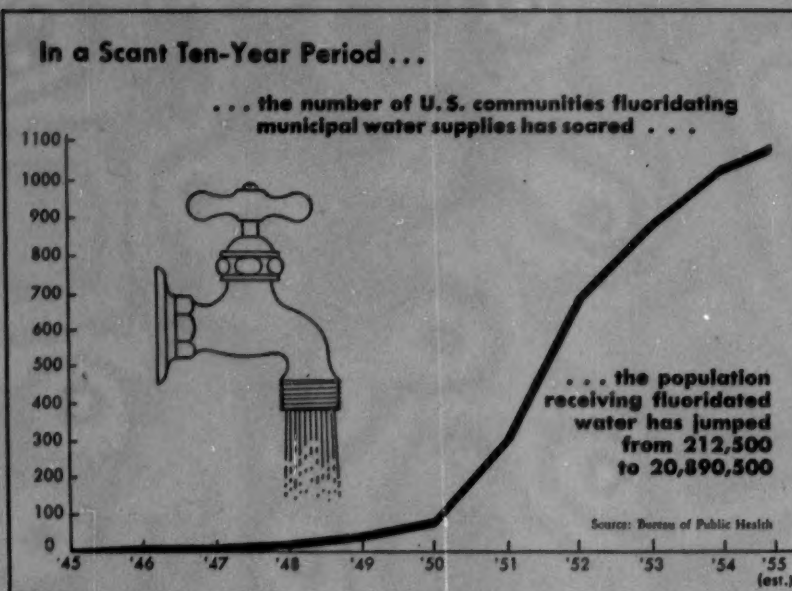


With business flourishing this fall, chemical process companies — whose plants have long been "automated" to a considerable degree — have been taking on production workers at a faster rate than most other industries. There's also

been a rise in recruitment for salaried positions — executives, engineers and scientists, salesmen, clerical workers. In the past two months, hiring of salaried employees spurted 2.6%; the number of hourly paid chemical workers dipped.

Charting Business

(Continued)

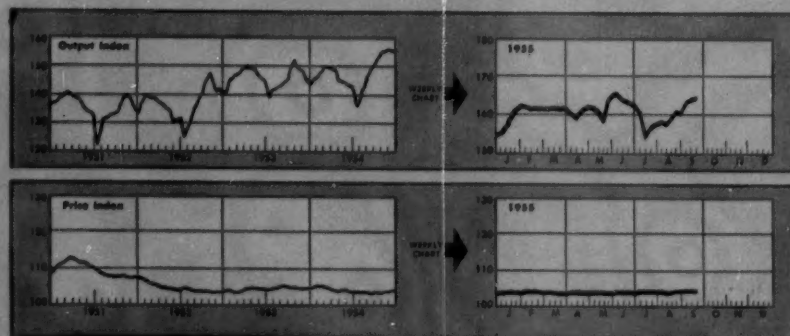


With the city of Chicago due to boost its total population level by mid-1956, fluoridation figures are soaring.

Unofficially, profluoridation supporters now predict the total number of U.S. residents receiving fluoridated water should reach somewhere over 60 million by 1960.

Similarly, the number of communities fluoridating public water supplies will increase (though at a slower rate). Reason: it's the major cities (New York is the big apple yet to fall) that should come around in the next few years.

And when they capitulate, outlying communities are almost sure to fall also.



WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Month	Year Ago
CHEMICAL WEEK Output Index (1947-49=100)	165.1	164.2	150.3
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.2	104.3	104.2
Stock Price Index of 11 Chemical Companies (Standard & Poor's Corp.)	466.2	488.3	328.9

MONTHLY INDICATORS

Foreign Trade			Exports			Imports		
(Million Dollars)	Latest Month	Preceding Week	Year Ago	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month
Chemicals, total	\$86.7	\$86.2	\$87.3	\$17.6	\$19.7	\$15.8		
Coal-tar products	5.7	5.8	7.1	3.7	3.8	3.2		
Industrial chemicals	11.5	13.2	12.9	6.2	6.4	5.1		



ENGINEERING
REPORTS:

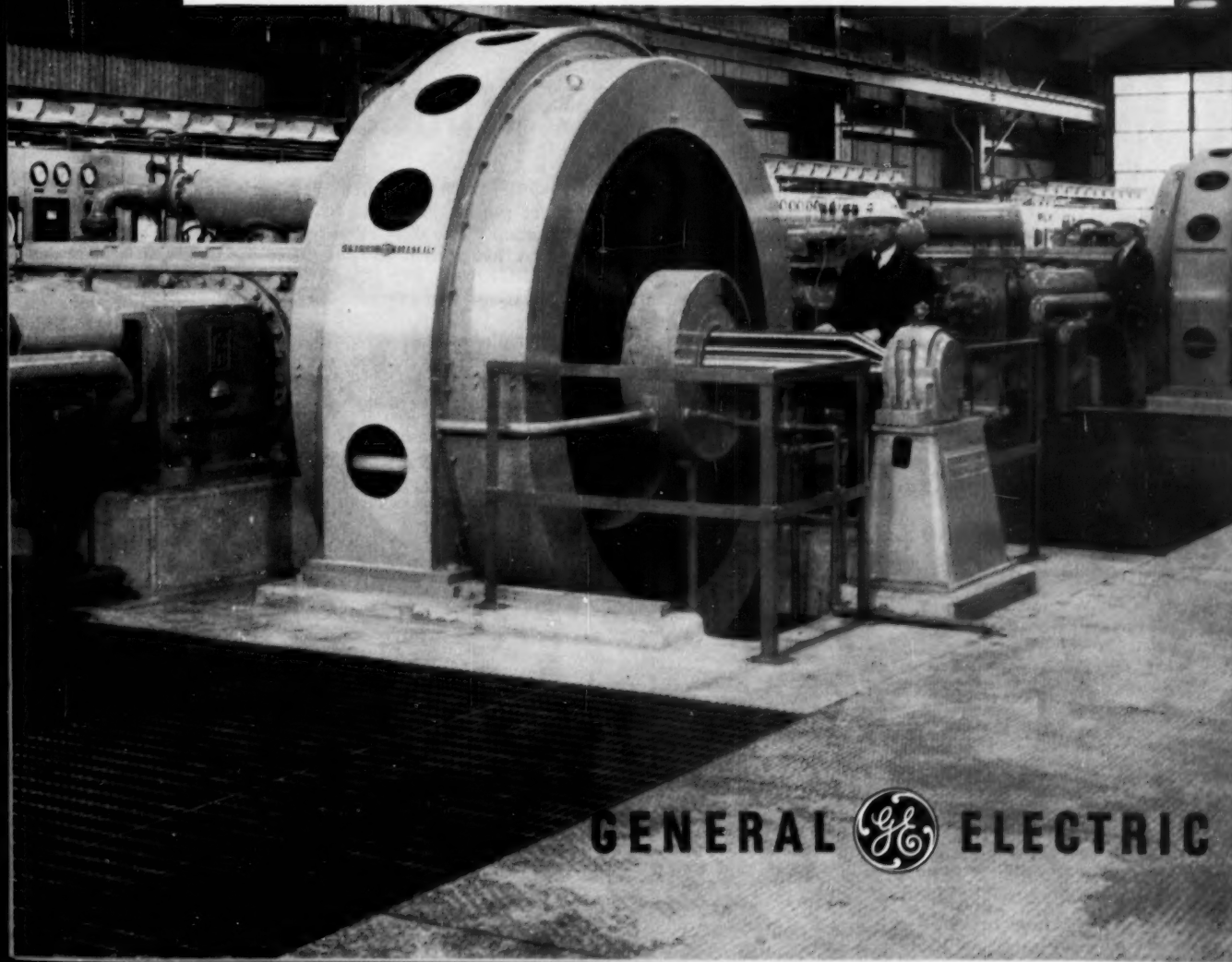
HOW G.E. CAN HELP YOU MEET INCREASED CHEMICAL PRODUCTION REQUIREMENTS

A NET EARNINGS RECORD YEAR, predicted at 10% above 1954, will be the result of increased production and sales in 1955. To meet production demand, chemical producers must continually review their plant electrical requirements. The G-E engineer's approach to your plant's increased electrical needs is through electrical systems that are . . .

681-4

- Adaptable to existing plant set-ups
- Designed for future expansion
- Flexible in application
- Easily maintained, durable and efficient

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GENERAL  ELECTRIC



SEVERAL AVAILABLE TYPES of protective enclosures make G-E motors ideal for all indoor or outdoor uses. New Polyex insulation

G-E ENGINEERED DRIVES AND POWER SYSTEMS MEAN . . .

Modern, more flexible processing lines

IN THE NEXT TEN YEARS, production must increase an estimated 50% to meet greater consumer needs. Available manpower will increase only an estimated 14% during the same period.

INCREASED OUTPUT AND EFFICIENCY must close the production gap between available manpower and estimated demand. General Electric electrical systems are designed and installed for efficient, flexible, easily expanded production.

G-E ENGINEERING SERVICES (see back page) can help you meet production requirements to bring your electrical system up to date. The result is a modern system integrated into your present plant setup.

FOR ADDITIONAL INFORMATION on how G-E engineered systems and engineering services can help you, contact your G-E Apparatus Sales Representative during your early planning at the nearest G-E Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y.

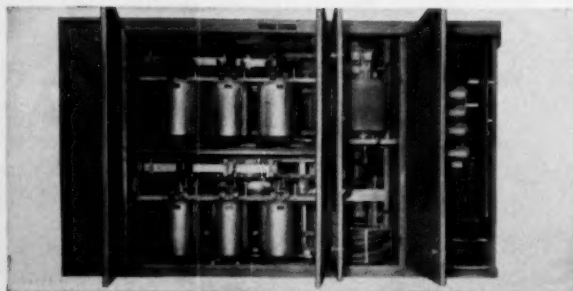
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Engineered Electrical Systems for Process Industries

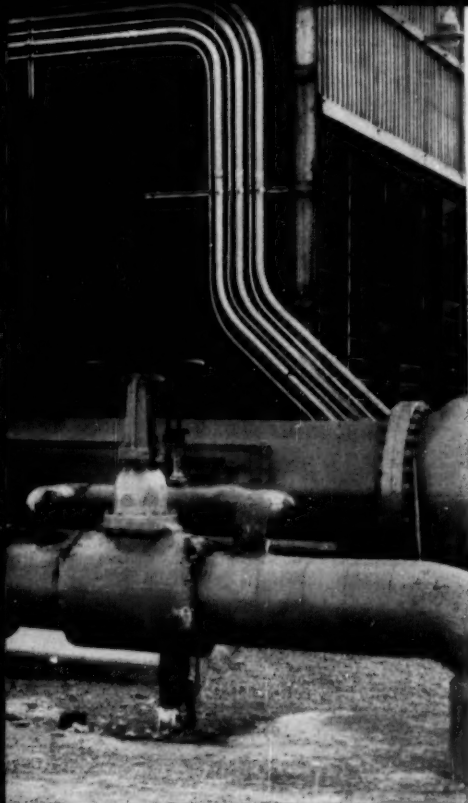
GENERAL  ELECTRIC



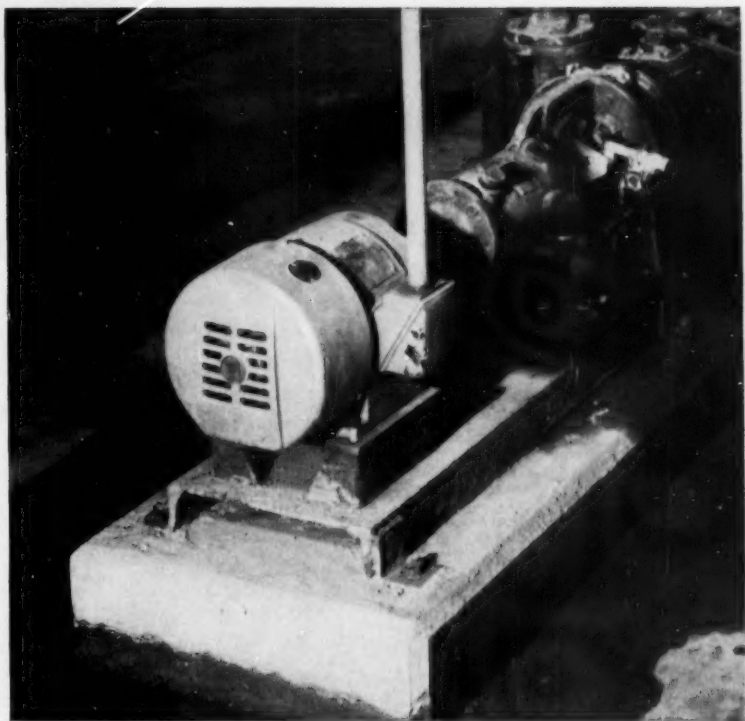
"BUILDING-BLOCK" design of this stack-rack capacitor block reduces installation costs. This design means equipment may easily be expanded or moved to meet plant requirements.



HIGH EFFICIENCY and low installation cost of this pumpless rectifier provide more reliable and economical d-c power. Factory wired, the unit is ready when it arrives to connect and operate.



gives up to 50% longer motor life.

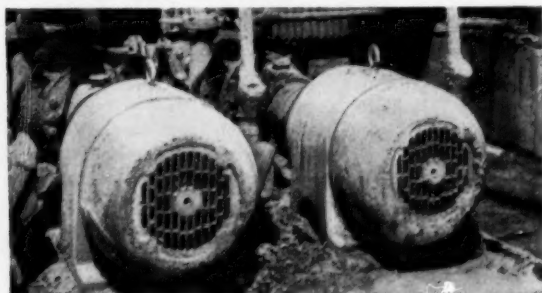


NEW G-E TRI-CLAD* '55' MOTORS, totally enclosed, are suitable for damp areas, even where hosing is necessary. New cooling system cleans while it cools motor.

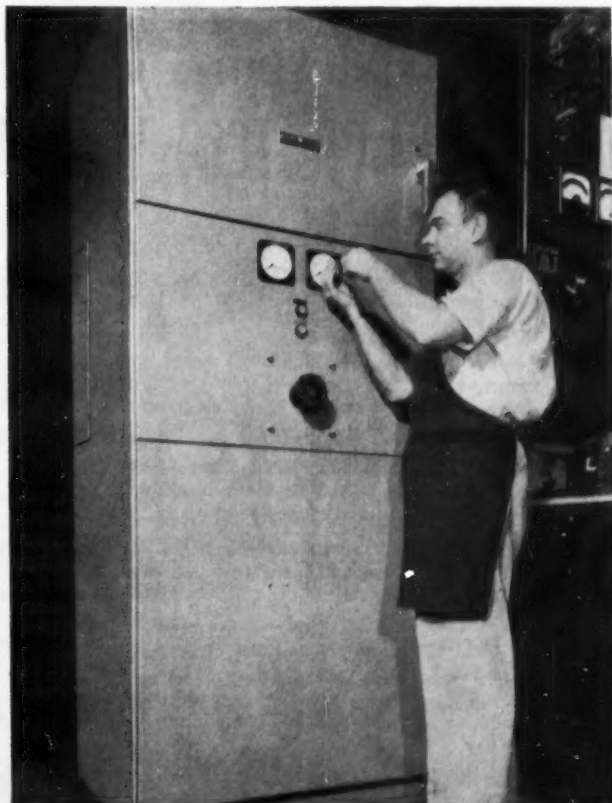
for your plant



G-E MAGNETIC STARTERS and safety switches are compact, for maximum space savings. Short-circuit protection is provided by circuit breaker or fusible disconnect switch.



CORROSIVE ATMOSPHERE effects are greatly minimized in these G-E Tri-Clad induction motors. Rugged cast-iron construction makes them excellent for process application.



SHORT CIRCUIT PROTECTION up to 60,000 amps, plus 50% greater space savings are provided by all-new G-E Limitamp*.

*Reg. Trademark of General Electric Company



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3 G-E PRODUCT DEVELOPMENT laboratories design and test new equipment under tomorrow's conditions to meet your future demands.

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Progress Is Our Most Important Product

GENERAL  ELECTRIC



BASIC PREMISE: Behind Joseph Trickett's development program at FMC is the cardinal principle that . . .

The Horse Comes First

Executive appraisal and management development programs in most companies have one main failing; they look good on paper, but rarely work.

Reason, says FMC's Trickett, is that many companies put the cart before the horse; instead of starting supplementary individual training and then drawing up organization charts, they reverse the procedure and flounder into all sorts of needless trouble.

Like the youngster who craves an ice cream cone but can't make up his mind what flavor to order, chemical companies are rarely sure what type of management development program they want. As a scheme to solve manpower problems and increase efficiency, executive development programs get much lip service; but because an aura of mystery generally surrounds the subject, and nobody knows for sure what's really needed, little of a firm and long-term nature is ever developed.

Most companies, at one time or another, try the organizational chart

method—listing all key executives, and designating heirs apparent. But the majority grudgingly admit that their efforts seldom achieve anything.

Why? That's the question that Joseph Trickett, Food Machinery & Chemical Corp.'s coordinator of management development at San Jose, Calif., set out to discover. FMC's top executives had given serious consideration to—and had even started up—a series of executive appraisal programs.

But none of the plans ever got off the ground. Trickett's guess was that the difficulty lay in three main faults:

- In the first place, most previous FMC attempts to tackle the problem started with the time-worn organizational chart system. That, Trickett felt, was putting the cart before the horse. Rather, he maintained, the company should concentrate first on getting its individual development programs functioning—worry about organizational charts only after all other things were running smoothly.

- Second, FMC wasn't getting proper cooperation from field management. Requested in previous false starts to fill out organizational tables and mail them in to headquarters, their enthusiasm was perfunctory at best. Moreover, the lack of spirit communicated itself right down the line; nobody openly resisted the idea, but no one sincerely supported it either.

- Third, the forms used in most executive appraisal attempts were complicated, time-consuming, and formal. "A lot of companies with sound management development programs and fancy manuals," claims Trickett, "simply don't use them. It's almost axiomatic that executives don't have time to read manuals."

Thus a good program must—to succeed—be simple, uncluttered and flexible.

Digging In: To get FMC's management program oriented to the special needs of the highly decentralized company, Trickett's first job was to visit all 16 operating divisions. Of each division head and individual plant manager he asked four questions: (1) What are you doing by way of performance review now? (2) How well do you know your people? (3) How well do you know how well they're doing their jobs? and (4) How do you encourage manpower development?

With answers in hand, he then retired to San Jose to develop the basic tools of FMC's current performance review and management development system.

Experience Record

Actually, Trickett points out, FMC's Personal Experience Record is nothing more than an inventory of training, experience, interests, and the like. But it's constantly subject to change. For example: the question "What do you want to do?" was added when Trickett discovered that fewer than 10% of all supervisors knew what their men wanted to do—"and what a man wants

to do certainly affects how well he does what he is doing."

Performance Review

In essence, this is actually nothing more than an organized outline for the review of each individual's performance. But it, too, is continually undergoing revision. For one thing, the title was changed from performance evaluation to performance review, since there was obvious negative reaction to the word "evaluation." ("Most people resent being evaluated; most enjoy being reviewed.")

Individual Development

The Individual Development Plan, arrived at in joint conference between the individual and his supervisor, is the heart of FMC's management development system. ("We will never have a management development program," says Trickett; "but we will have as many programs as there are individuals to be developed.")

Plant managers are constantly advised, "If forms don't help you, don't use them. The important thing is the individuals, not the forms."

In practice, each year, on the anniversary date of a man's employment with Food Machinery, his supervisor and two other persons (usually another supervisor and the local program coordinator) sit down and discuss his performance over the past 12 months. Meanwhile, the individual concerned is filling out his own performance review summary sheet for his own edification. ("It is not turned in to the boss, but helps give him a better understanding of his performance as he sees it, and prepares him for the conference with his supervisor.")

In all cases, though, wherever a point on the form is not pertinent, it is left blank. ("This is one form not to be completely filled in.")

After the supervisor has had a chance to digest the consensus of the performance review, he draws up a tentative individual development plan and sits down with his subordinate to discuss it. Ideally, this all takes place the same day. (Interestingly, Trickett recommends that every individual be shown the consensus opinion—but not all supervisors prefer to do so.)

The fact is continually stressed that the program is aimed at long-term development.

"We're trying to help the man help

himself overcome his weaknesses," says Trickett. "If we can help each individual improve himself even slightly over a 10-year period, think of what it would mean to both the individual and Food Machinery at the end of the decade."

"We're not trying to change people—we're just trying to capitalize on their abilities. For example, if a man is drinking too much, it's up to the supervisor to point out how drinking is affecting his job—not to probe into the whys and wherefores."

If professional medical or psychiatric advice is felt to be necessary, the supervisor can suggest—but not insist

ing them—as a result of talks with assistants around the country.

- Taking the forms around personally to each of the 28 separate localities, and literally selling both managers and staff on their use.

- Making information available to program coordinators on such matters as what other companies are doing on management development, what college extension, on-campus or correspondence courses are available for incorporation into individual development programs, and what current books and articles bear on the subject.

- Assisting divisions more "backward" in using management develop-

PAPERWORK: All FMC management development forms are tools, not tyrants.

—on it. "We've no intention of becoming mind meddlers."

Who's Included: The FMC management development program today covers all "key people"—usually including all "exempt" (from overtime) salaried employees up to and including division heads.

The idea was first put in use in Nov. 1953, but it took almost a year to get all divisions active in it. Today, it's operating in all 28 of FMC's plant sites, is being introduced into two recently acquired divisions.

Trickett's job in keeping the ball rolling divides itself into four functions:

- Developing the forms and amend-

ment techniques to catch up with the others. (This is a particularly touchy—but much needed—chore in a firm as highly diversified as FMC.)

Management itself is wholeheartedly in support of Trickett's ideas. Says one promising chemical engineer with a bright future but heretofore somewhat lacking in company loyalty: "At last somebody is finally taking an interest in me. I never knew before that Westvaco was so vitally concerned with people."

In another performance review (of a production foreman) the maintenance supervisor charged the foreman with poor attention to maintenance. This developed into a profitable dis-



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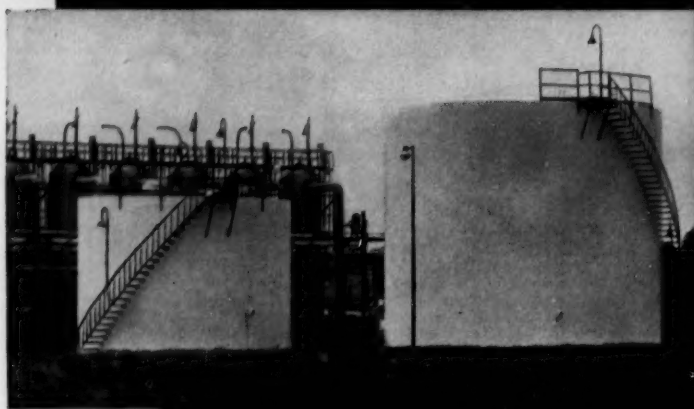
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cussion as to what could be done to
reduce interference of maintenance
work with production schedules.

Five division managers, as a direct
result of the plan, are now enrolled in
college management courses; Food
Machinery is conducting salesman de-
velopment seminars for sales managers
in answer to a need made obvious dur-
ing performance reviews; and pilot
programming for middle management
has started to fill a gap in the com-
pany's manpower needs.

Eventually, top management hopes
to set up a clearing house to identify,
select and place executives (and po-
tential executives) where they are
needed most throughout the entire cor-
poration. In the past, personnel of-
ficials admit, there have been many
times when Food Machinery has
brought in executives from outside—
when men of ability in other company
divisions were completely overlooked.

"Horizontal shifting," one vice-
president states, "is something we've
all dreamed about but never really
realized. Now, for the first time, it
looks possible."

Key to the success of the entire pro-
gram is to keep all activities, as much
as possible, at a grass-roots level,
Trickett insists. The basic purpose of
the whole procedure is to permit each
individual to see himself, and thus help
himself.

"Performance review at Food Ma-
chinery," he concludes, "is only a step
in a custom-tailored development plan.
It's never a rating or an end product in
itself, but rather a tool to build men
. . . tomorrow's executives."



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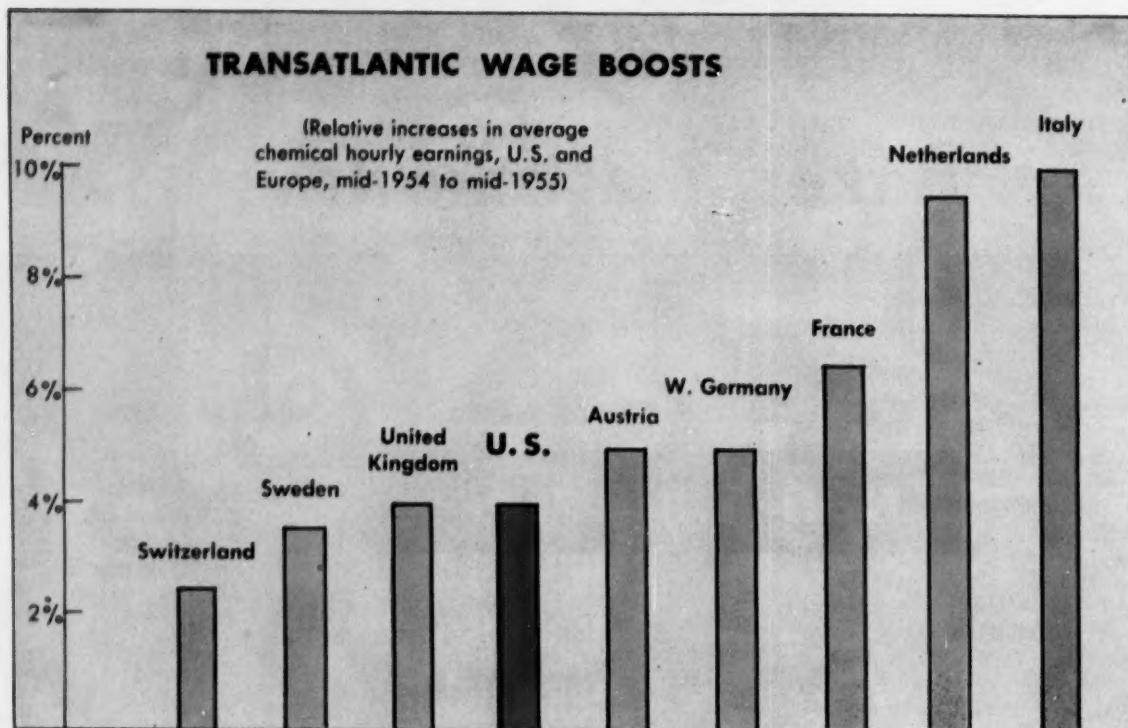
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'Pink' Dogma Ditched for Capitalistic Cash

New pitch by chemical labor unions in western Europe: straight wage gains stressed (as in U.S.), old socialistic aims de-emphasized.

Europe's chemical wage rates still lag far behind those of U.S., but new trend may cut European producers' present advantage on labor costs.

If your company is concerned about foreign competition, make a note to keep an eye on what may turn out to be a sharp switch in the wage practices of the chemical industries in Europe.

This new trend appears to be under way now, pushed by a turnabout in policies on the part of European labor unions. Formerly motivated primarily by a longing for "social change," those unions are now shifting their emphasis to demands for more monetary change in the workers' pockets.

The move toward the role of U.S. labor unions—which traditionally stress immediate gains in wages and working conditions rather than ideology—is illustrated by the bargaining under way this week in West Germany, where chemical unions are seeking hefty wage rises in new re-

gional contracts with employer groups.

Socialism Waning: It used to be that German trade unions were in the vanguard of the world socialist movement. Now, those unions don't want to destroy capitalism; they want to capitalize on it. And it seems that they've made more progress in this direction in the past few years than they made along the Marxian path in the preceding half-century. In the crowd at a German football game, one observer asks, Who can tell a worker from an executive?

During the year preceding the current negotiations, West German chemical wages climbed by amounts ranging from 4% to 6½% over 1954 levels. Now—in language remarkably similar to that used by U.S. union leaders—the German unions are bidding for "a larger share in West Ger-

many's present prosperity."

Profit-Sharing in Britain: Over in the United Kingdom, there's an equally strong trend toward capitalism among chemical workers. During last spring's parliamentary election campaign, the Labor Party platform included a proposal to nationalize the British chemical industry; but this fell flat as a campaign issue, and has been totally eclipsed by the Conservative victory. (Nevertheless, the idea is still cherished by General Secretary Robert Edwards of the Chemical Workers Union and a few other British laborites.)

One development that is expected to prove particularly effective in further convincing British chemical workers of the advantages of private enterprise: profit-sharing, which is now being introduced on a large scale by Imperial Chemical Industries, Ltd., and Courtaulds, Ltd. Both of these giant companies are offering common stock to their employees.

While chemical wages in the U.K. are still much lower than those in the U.S. (see table), the British pay rates have been increasing relatively

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STILL WIDE: U.S.-EUROPEAN WAGE GAP

(Average hourly earnings for job classification "mixer" in chemical plants in Europe and U.S.—Oct. 1954. Sources: International Labor Office, U.S. Bureau of Labor Statistics)

Nation	Average Hourly Earnings	Equivalent in U.S. Dollars	Percent of U.S. Rate
Austria	5.95 schillings	\$0.23	12.1%
Belgium	19 francs	0.38	20.0%
Germany (Fed. Rep.)	2.09 marks	0.496	26.1%
Italy (Milan)	167 lire	0.267	14.1%
Netherlands	1.14 florins	0.30	15.8%
Switzerland	3.30 francs	0.76	40.0%
United Kingdom	3.30 shillings	0.462	24.3%
United States	\$1.90	1.90	100 %

faster as the British unions have been watching the wage drives of their counterparts in the U.S. Over the past seven years, average earnings of U.S. chemical workers went up 39.6% compared with a 53.3% rise for ICI employees (who make up about one-third of all British chemical workers).

Flexibility in France: Hourly earnings in the French chemical industry rose 6.5% over the past year, while the corresponding U.S. figure climbed 5.3%. Another advance toward U.S. working conditions: the average scheduled work week in French chemical plants dipped from 44.8 to 44.1 hours, and productivity per man-hour appears to be up by 5-6%.

Just beginning in France is the plant-by-plant bargaining system that has long prevailed in the U.S. chemical industry. Previously, the French government had supervised industry-wide bargaining with results that were not to the liking of either party.

Shorter Week Sought: Italian chemical companies—bargaining jointly through their national association—granted contract changes last October that amounted to a wage increase of slightly more than 10%; and Austrian chemical concerns—also banded together in a national organization—gave their employees a 5% increase in mid-1954 and a similar rise this summer. Smaller relative wage hikes have come in the smaller European countries' chemical plants. Dutch chemical workers are now on a 42-hour work week instead of the former 48-hour standard, and Belgian labor unions

want a five-day week and 40¢/hour.

Basic to this new labor situation in western Europe: generally high levels of prosperity and employment, with skilled workers in short supply in some areas. These factors greatly bolster the position of the labor unions in straight wage bargaining.

European chemical wage rates still lag far behind those of U.S. producers, and this remains a critical advantage in international trade of some products. But if present chemical wage trends continue in Europe, the big gap in labor cost per unit of production may narrow considerably over the next few years.



BARRATT, LONDON

BRITAIN'S EDWARDS: For chemical expropriation plan, a '55 setback.

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ANHYDROUS

Sodium Polyphos

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(SODIUM TETRAPHOSPHATE)

Trisodium Phosphate

CRYSTALLINE
MONOHYDRATE

Sodium Phosphates

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**Trisodium Phosphate
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ANHYDROUS
CRYSTALLINE

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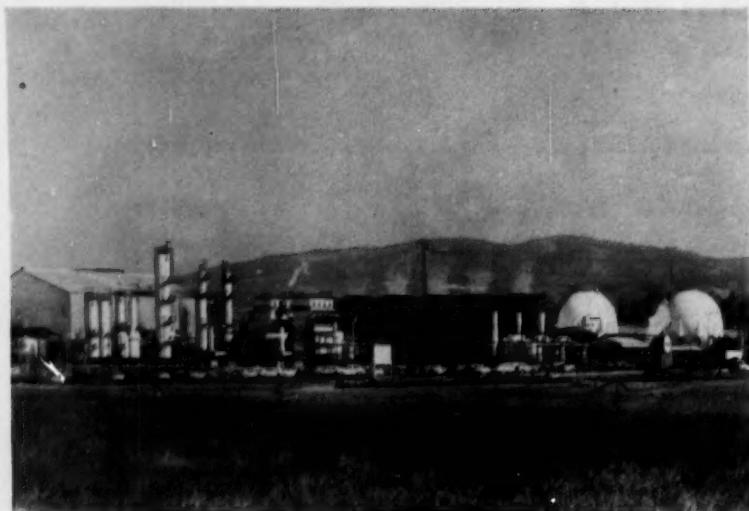
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WESTERN CHEMICAL CAPACITY: Growth slowed in some lines, but . . .

Bigger Role Still Beckons

Chemicals are destined to play a still larger part in further industrialization beyond the rugged Rockies; but delay in building four long-expected plants for certain end products is retarding some aspects of chemical industry growth in the Far West.

This comes as a major message from Stanford Research Institute's second annual Western Area Development Conference, in Portland's Multnomah Hotel, where 315 Western-minded industrialists and business men checked in for a two-day whither-are-we-heading caucus.

That chemical companies in the Far West are not letting cactus grow under their feet is evident from computations by Stauffer Chemical's William Eipper. On the West Coast, he figures, chemical plants valued at about \$40 million will be completed during 1955, leaving other plants costing \$80 million under construction, with an additional \$80 million worth of chemical plants blueprinted for future building.

Key Plants Lagging: This expansion of Western chemical industry will in itself provide a greatly broadened market for chemicals, Eipper suggests, noting that the chemical industry is generally accepted to be its own best customer.

But production of a number of chemicals—particularly acetic acid or anhydride and carbon disulfide—is not being built up as rapidly as desired be-

cause long-discussed plans for these four plants for end-use products just haven't materialized yet:

- A rayon plant, close to lumbering centers.
- A cellophane plant, tailored for the Western market.
- A cellulose acetate plant for manufacture of film and molded products.
- A synthetic fiber plant, geared to the young and growing textile industry on the West Coast.

Some Surplus Capacity: The area probably has more capacity than it presently needs for polystyrene and phenolic molding compounds, Eipper judges, and more than adequate capacity for unsaturated polyesters for laminating. Ditto for adhesive resins and coating resins of most types. And it's understood that Du Pont's forthcoming tetraethyl lead plant at Antioch, Calif., will have a capacity approximately equal to West Coast requirements.

He sees a possible opening for a titanium dioxide plant on the Pacific Coast; the market there is good-size and so far is served entirely with material produced outside the area.

The West's output of ammonia, nitric acid and other fertilizer products has been increased at a greater-than-average rate, Eipper says; likewise for boron compounds, elemental phosphorus, and magnesia from sea water bitterns.

Aluminum and Power: While Eipper spoke glowingly of past growth in primary aluminum production in the Northwest, Robert Fratus of Kaiser Aluminum & Chemical deplored the slowdown in this field since 1950. "The program for developing hydroelectric power in the Pacific Northwest," he declared, "must be stepped up."

This appeared to some observers to be a rejoinder to an assertion by a previous speaker that morning that the federal government should get out of the electric power business. This was the view reiterated by William Shannon, member of the Hoover Commission's task force on water and power policies; and his remarks drew expressions of approval (broad smiles and nods) from some listeners, signs of disagreement (head shaking and muttering) from others.

Responding to a query from the floor, Fratus said that the increasing spread between copper and aluminum prices hasn't yet resulted in a big switchover from copper to aluminum on the part of fabricators. "You don't change people that easily," he ended.

More Steel Coming: Robert Oliver of U.S. Steel's Columbia-Geneva Division sees a "chicken-or-the-egg" element in the question of whether Western steel capacity should lead or follow the regional demand for that metal. Observing that "much of industry must have steel readily available at competitive prices in order to build or expand its plants," Oliver said that steel industry growth in the West is projected at about twice the rate for the nation as a whole.

Other speakers included Governors B. Frank Heintzleman of Alaska and Samuel King of Hawaii, whose territories are economically linked to the Pacific Coast states. There was interest among chemical process delegates in Heintzleman's plug for Alaska's wealth of timber, oil and gas, sulfur, tin, copper, nickel, chrome, uranium and iron, plus numerous hydroelectric power sites, unlimited quantities of fresh water, and large fisheries and agricultural lands.

A growing economy is a healthy economy, keynoted SRI's Jesse Hobson; but over-industrialization is progress in reverse. His plea: for an understanding of the most suitable patterns for sound, balanced development of agriculture, mining and manufacturing.



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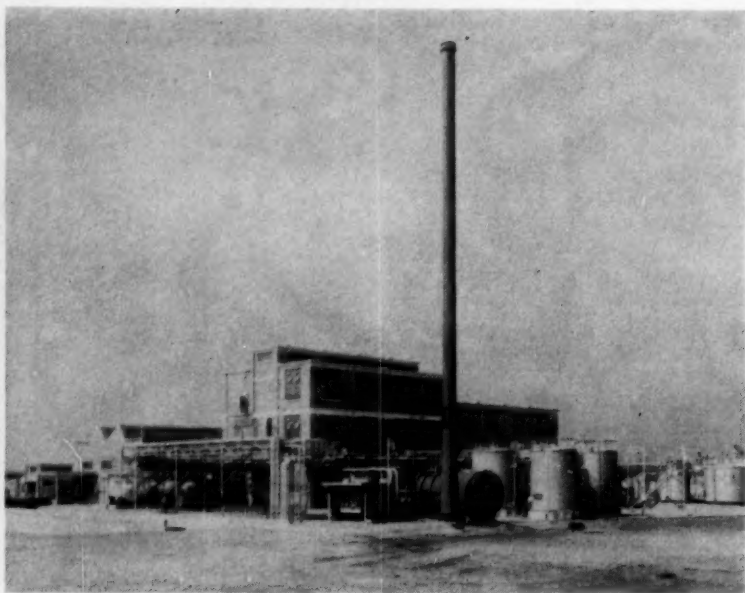
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IN CHESHIRE: Shell Chemical Co.'s epoxy resin plant is now operating at full capacity—2,000 long tons of resins annually.

FOREIGN.

Resins/Great Britain: With a large-but-unhurried public opening late last month, Shell Chemical Co., Ltd., brought its \$2-million epoxy resin plant outside Liverpool into full production. Designed by Shell's Dutch engineers, the plant has a capacity of 2,000 long tons/year of seven grades of resins, will contribute heavily to Great Britain's annual demand for 50,000 tons of resins.

Petrochemicals/West Germany: Rohm & Haas, GmbH., Chemische Fabrik (Darmstadt, West Germany) has just brought new petrochemical units onstream, designed to produce acetone cyanhydrin from natural gas. The natural gas—which is piped from gas fields in Stockstadt—consists of about 98% methane, is reported to be under consideration by the firm for use in production of additional petrochemicals.

Mineral Deposits/Australia: National Lead Co. has formed a new Australian subsidiary, Mineral Deposits Proprietary, Ltd., to acquire the mine, plant and mineral leases formerly owned by Mineral Deposits Syndicate.

Russian-Indian Cooperation? According to reports from Bombay this

week, the Soviet Union has expressed a desire to help India become self-sufficient in producing its requirements of essential drugs.

India currently imports drugs valued at 180-200 million rupees/year.

Phthalic Anhydride/Great Britain: Monsanto Chemicals, Ltd., will build a new phthalic anhydride plant at Newport, Monmouthshire.

Estimated to cost \$1.4 million, the plant when in production (sometime toward the end of 1957) will increase Monsanto's production of phthalic anhydride in Great Britain to 15,000 tons/year.

Fertilizers/India: The board of directors of Sindri Fertilizer (Calcutta) is considering a price reduction of Indian-produced fertilizer—now selling at \$56.84/ton. Output for Sindri is now running at 320,000 tons; Indian consumption is 550,000 tons/year.

Synthetic Rubber/West Germany: Plans are now virtually complete for construction of a synthetic rubber plant by Buna-Werke Huels GmbH (Bonn, Germany). The plant will have a capacity of 45,000 tons/year of rubber—approximately one-third of West Germany's current annual demand. Completion is scheduled for late 1957.

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NE
CH₃CH₂NO₂

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to give new direction
to the chemical industry

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2-NP
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Molecular Weight	61.04	75.07	89.09	89.09
Boiling Point at 760mm, °C	101.2	114.0	131.6	120.3
Azeotrope with Water, bp, °C	83.6	87.1	91.2	88.4
NP in azeotrope, % by weight	77.1	73.6	64.5	73.1
Vapor Pressure at 20°C, mm	27.8	15.6	7.5	12.9
Evaporation Rate, by volume*	139.0	121.0	88.0	110.0
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Specific Gravity at 20/20°C	1.139	1.052	1.003	0.992
Density of Vapors (air = 1.00)	2.11	2.58	3.06	3.06
Weight per U.S. Gallon at 68°F, lb	9.48	8.75	8.35	8.24
Coefficient of Expansion, per °F	0.00064	0.00062	0.00056	0.00058
Refractive Index, n _D at 20°C	1.3818	1.3916	1.4015	1.3941
Surface Tension at 20°C, dynes/cm	37.0	31.3	30.0	30.0
Heat of Vaporization at 30°C, cal/g	143.3	124.8	107.3	104.4
Heat Capacity at 25°C, cal/g	0.422 ^{30°C}	0.441	0.471	—
Dielectric Constant at 30°C	35.76	28.00	23.22	25.48
Ignition Temperature, °F	785.0	778.0	789.0	802.0
Flash Point, °F (Tag Open Cup)	112.0	106.0	120.0	103.0
pH 0.01M Aqueous Solution at 25°C	6.4	6.0	6.0	6.2
Solubility in Water at 20°C, % by volume	9.5	4.5	1.4	1.7
Solubility of Water in NP at 20°C, % by volume	2.2	0.9	0.5	0.6

*N-Butyl Acetate = 100

NP DERIVATIVES ALSO AVAILABLE

AB (2-Amino-1-butanol)	NMP (2-Nitro-2-methyl-1-propanol)
AEPD (2-Amino-2-ethyl-1, 3-propanediol)	ALKATERGES
AMPD (2-Amino-2-methyl-1, 3-propanediol)	TRIS AMINO (Tris [hydroxymethyl] aminomethane)
AMP (2-Amino-2-methyl-1-propanol)	TRIS NITRO (Tris [hydroxymethyl] nitromethane)
NB (2-Nitro-1-butanol)	HAS (Hydroxylammonium Acid Sulfate)
NEPD (2-Nitro-2-ethyl-1, 3-propanediol)	HC (Hydroxylammonium Chloride)
NMPD (2-Nitro-2-methyl-1, 3-propanediol)	HS (Hydroxylammonium Sulfate)

SAMPLES ON REQUEST

Here are the Nitroparaaffins — NM(Nitromethane), NE(Nitroethane), 1-NP(1-Nitropropane) and 2-NP(2-Nitropropane). These four NP's have a potential range of usefulness unequalled by any other group of organic chemicals! CSC's new Nitroparaaffin plant at Sterlington, La. is now in full production. Additional facilities for increased volume of NP derivatives are nearing completion.

In many cases, they provide better and more economical methods of manufacturing well-known and widely used industrial chemicals. However, the majority of the reactions yield entirely new compounds. There are practically an unlimited number of products which can be prepared from the NP's. As solvents, they present an unusual combination of properties — they are medium-boiling, mild-odored and, most important of all, they have strong solvent power for a wide variety of substances, including many coating materials, waxes, resins, gums, dyes, fats and oils, and numerous organic chemicals. The CSC Nitroparaaffins are chemistry's newest stars. They give new direction to the production of old products and the development of new.



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LEGAL

Fungicide Suit: In U. S. District Court at Wilmington, Del., Rohm & Haas is pressing a patent infringement suit against Chemical Insecticide Corp. and U. S. Fungicide Corp. R&H wants the court to issue temporary and permanent injunctions against infringement of the Dithane D-14 fungicide patent issued to R&H in 1943 and later reissued to that company. Rohm & Haas also is asking judgment for damages.

Parents Ask Damages: Parents of two girls at Louisville, Ky., are suing a used car firm and a chemical company, alleging that the two girls—6 and 8 years old, respectively—were burned on their arms by battery acid from a jar that had been left on a used car lot. The parents charged that the chemical firm had been told to pick up the jar but had failed to do so.

Patent Law Proposals: On both sides of the Atlantic this week, there's talk about revision of patent laws that have caused or may cause considerable litigation.

• In Rome, the cabinet of Premier Antonio Segni has decided to submit to the Parliament a bill that would authorize granting of patents on pharmaceutical production processes. This would annul an 1859 law—still in effect—that has resulted in numerous complaints of "pirating" and "infringement" of manufacturing methods developed by U. S. and other non-Italian drug producers (*CW*, Jan. 15, p. 24).

• In Washington, Rep. W. Sterling Cole (R., N.Y.) has been launching another attack on the compulsory licensing provision of the atomic energy act of 1954. Cole promises that in the next session of Congress he'll try to have this "stifling influence" repealed because it's "completely hostile to the American system of private enterprise." He says the section as it now reads is more of a threat to small companies and individual inventors than it is to large concerns.

Courts as First Resort: Every week it's becoming more commonplace to rely on court action in air and stream pollution problems:

• At Houston, Tex., where pollution has become the issue of the day (*CW*,

Oct. 1, p. 30), hearings were scheduled this week in civil court and next week in criminal court on suits against Consolidated Chemical Industries and Merichem Co., respectively. County Attorney Burke Holman is asking that Consolidated be enjoined from making sulfuric acid until air pollution control devices are installed. Assistant District Attorney Pete Williams is expected to prosecute the Merichem case.

• At Chattanooga, Tenn., three farmers have filed \$25,000 civil suits in U.S. District Court against Tennessee Copper Co. They assert that the company—through "carelessness and negligence"—allowed its Copperhill plant to emit fumes that damaged crops, fruit, timber, fences, roofs and soil on their nearby farms.

• At St. Louis, County Prosecuting Attorney Edward Garnholz urges the new county grand jury to investigate alleged contamination of several streams; and out in the state of Washington, the State Pollution Control Commission is asking the attorney general for advice on enforcement of its newly issued blanket order requiring treatment of industrial and other waste in Lake Washington, the Columbia River, or other bodies of water.

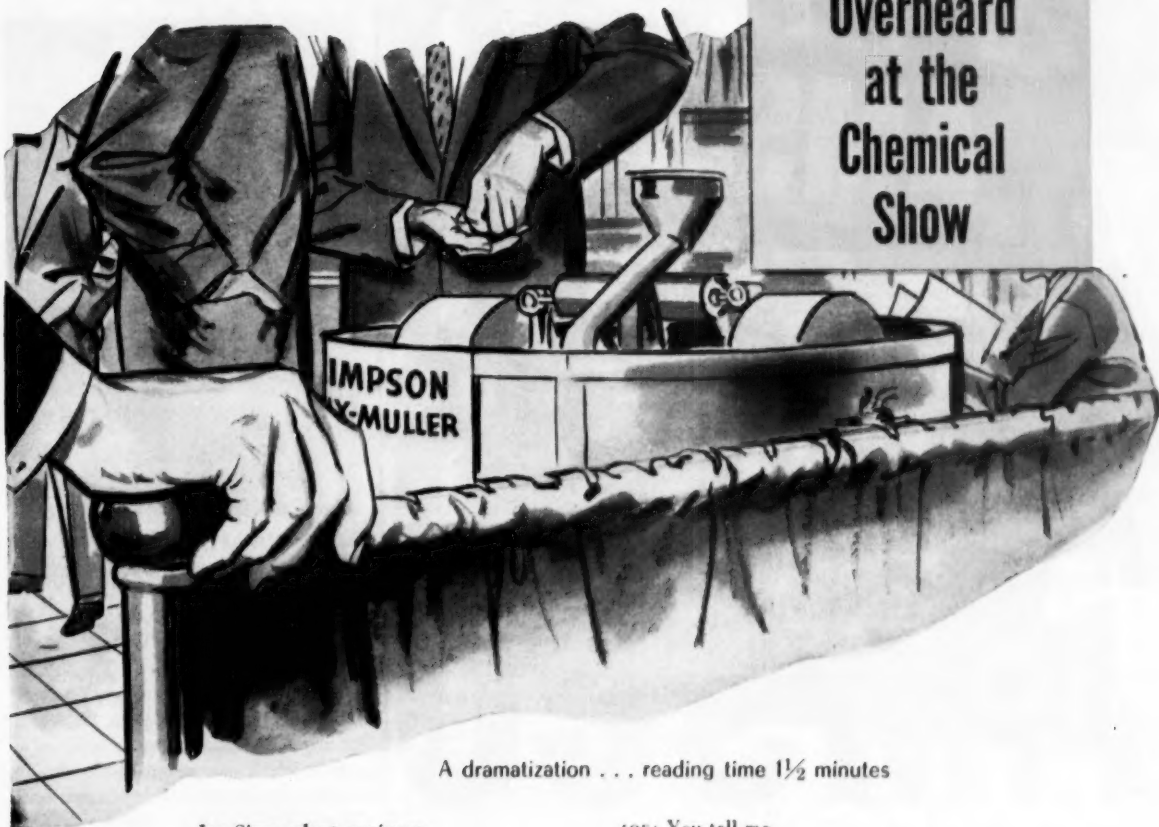
Now in Contention

After deliberately avoiding discussion of its intentions for two years, Texas Gulf Sulphur Co. has made its move in the Mexican sulfur production race (*CW*, Aug. 27, p. 16).

By next spring, the company expects to have in operation a plant utilizing 1 million gal./day of water at Nopalata—about a mile upstream on the Coahuila River from the site where Gulf Sulphur Corp. is readying production units. Proved deposits indicate sulfur holdings at 1 million tons.

Unlike other U.S. companies in Mexico, Texas Gulf will use a barge-mounted plant. This decision has been causing a stir among competitors—but most observers point out that it may simply be a cleverly devised safety factor, for Texas Gulf also has sulfur deposits at Textistepec—about 10 miles southeast of Jaltipan, where Pan American is working deposits. If deposits at Nopalata fail to hold out, the company could build a 6-mile connecting canal to Textistepec, simply float its plant downriver to another deposit.

Overheard at the Chemical Show



A dramatization . . . reading time 1½ minutes

Joe Sims, plant engineer,
wasn't as idly curious as he sounded
when I overheard this conversation
at a recent trade show:

JOE: What're you grinding up there?

Answer: It's sawdust—but we don't *grind* anything
here. We're "mulling" (*pouring the contents of an
envelope into the mixer*). Watch this . . . (*pause*).

JOE: That was fast!

Answer: The Mix-Muller dispersed that green dye
throughout the sawdust in less than 2 minutes. Call
the dye a binder or a reagent and you can better under-
stand why a smearing or rubbing action is essential
where dry materials must be mixed with relatively
small quantities of liquids, semi solids or amorphous
solids.

JOE: You tell me.

Answer: OK, if I *stirred* the dye in with a stick or
paddle we would have a pepper and salt effect. The
elements would be *next* to each other but not blended.
It takes the folding of the Mix-Muller plow action,
combined with a rubbing, kneading, muller action to
give you an intimate, *reacted* if you will, blend of
materials. Apply that to a product that must be
extruded, cast, briquetted or wetted to a slurry and
you can see why we say we sell *controlled uniformity*
here.

JOE: (*Later and aside to me*) You know, asking
those Mix-Muller people what mulling is, is like
putting a nickle in a juke box. They've got a whale
of a story on mixing dry solids—I *know* . . . we've got
five of them in our plant. I reconfirm this story every
time I come to this show.

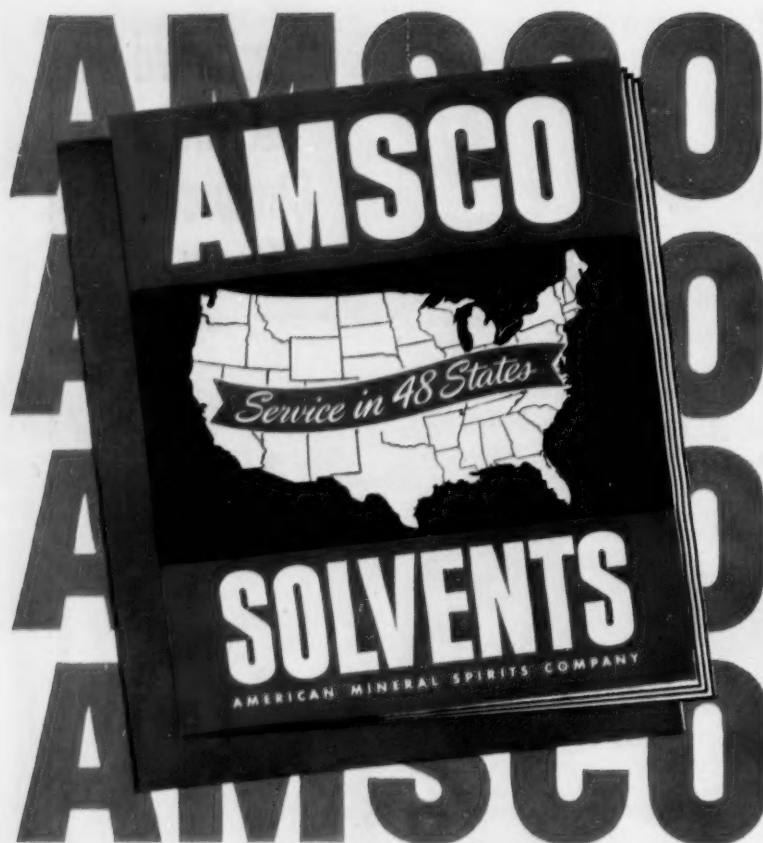
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MEDIATOR FINNEGAN: In week of turmoil, his agency gets SOS appeal.

LABOR.

In and Out of Courts: The industry's labor unions have been getting into and out of court jams all week. Among their headaches:

- A break was expected any day in the four-month strike by International Chemical Workers Union (AFL) against International Minerals & Chemical Corp. at Bartow, Fla. The strike is sputtering along on three fronts: on the picket lines; in state circuit court at Bartow, where Judge William Allen has issued new restrictions on picketing but has dismissed contempt-of-court proceedings against the union; and in bargaining talks, which have bogged down on rules for transfers and overtime work. To help break this deadlock, the company wired Joseph Finnegan's Federal Mediation & Conciliation Service requesting "a panel of commissioners of conciliation."

- In the dispute over the tank re-coating job at Stauffer Chemical's plant at Niagara Falls, N.Y. (CW, Newsletter, Sept. 17), State Supreme Court Justice Regis O'Brien has ruled that it's up to the National Labor Relations Board to handle this case. O'Brien also canceled a temporary antipicketing order that had been granted at the request of the painting contractor. O'Brien said that the picketing on the part of the AFL Painters in an attempt to organize the contractor's employees was lawful and orderly.

Corrosioneering News

Quick facts about the services and equipment Pfaudler offers to help you reduce corrosion and processing cost.



Published by The Pfaudler Co., Rochester, N. Y.

3,000- to 4,000-gallon glassed reactors now offered in low-cost *standard* designs

Smashing the size barrier, The Pfaudler Co. now fabricates glassed steel reaction kettles in the 3,000- to 4,000-gallon range — as *standard* models.

This use of standard designs saves you money because it eliminates special engineering. And it saves time because it uses stock parts and standard accessories.

Of course, where your requirements are of a special nature, special refinements are available, as well as entirely custom-engineered reactors up to 7,500 gallons.

Space-saving drive support

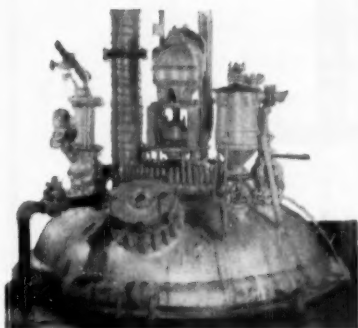
Drive is rigidly supported on a separable center cover, making other top head openings easily accessible and leaving plenty of space for all nozzles usually required.

Nine openings—various sizes

You get the full advantage of versatile glassed steel because the top head is equipped with nine nozzles, in several sizes, to facilitate adapting the unit to a wide variety of processes.

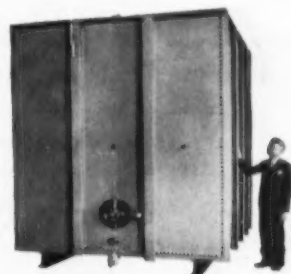
Other advantages

Offset bottom outlet, efficient jacket provides clean-out ports. Pfaudler



This glassed steel reactor at Schenectady Varnish Co. incorporates these new standard features. Note its compact drive support, leaving ample head space for other equipment. Left of drive is a glassed steel column, 18" dia., for calcium chloride; right foreground is 14" glassed steel hopper for adding catalyst.

agitating nozzles and many other plus values are available in these new standard model reactors. Your Pfaudler representative has all the facts. Write or call him.



Pfaudler rectangular tanks make full use of every square foot of available floor space.

Endless variety of storage problems solved with glassed steel

You can make efficient use of floor space with one of the many Pfaudler glassed steel tank designs up to 35,000 gallons; cylindrical tanks (horizontal or vertical), rectangular tanks that utilize every inch of floor area and head room, and square panel vats that can be assembled on the spot.

The smooth surface of Pfaudler tanks is extremely easy to clean because almost nothing sticks to glass, besides being corrosion resistant.

The glass-to-steel bond is actually a chemical union of the two materials — so strong that in tests a force of 1,500 lbs. per sq. in. was unable to separate them. Thus you need not fear any peeling off of the inner lining. Thus you are able to handle liquids and solvents through a wider temperature range than with other types of lined tanks.

the methanol in the charge, in a concentration of at least 90%, and essentially acid-free.

Low cost is another important advantage of this system. By providing a standard "packaged" assembly, Pfaudler has been able to eliminate most engineering charges involved in developing an assembly especially for your specific operation.

Your Pfaudler representative can answer your specific questions. Call or write him.

For further information on standard glassed reactors, packaged fractionating assembly, or storage vessels, write to Department CW-10, The Pfaudler Co., Rochester 3, N. Y.

New fractionating assembly is small but highly effective

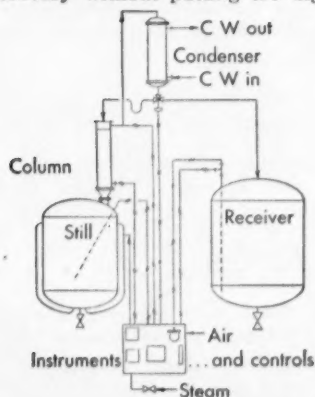
Here is a small fractionation assembly, in "packaged" form, that can easily put you on the road to solvent recovery without putting too big a

crimp in your budget.

It makes use of a glassed steel still and column, to provide maximum corrosion resistance where there is acid present in the batch. This makes the assembly highly practical for such materials as methanol, ethanol, acetone, and ethylene dichloride.

Because the acid remains in the still, the condenser is fabricated from type 316 stainless steel. A glassed steel vacuum receiver is provided for maximum service life, versatility and product purity.

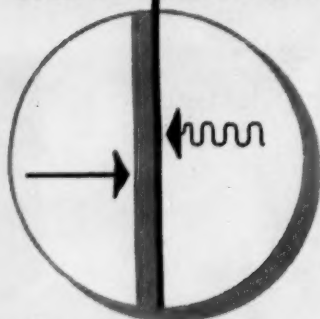
With this assembly, Pfaudler can actually give you a *guarantee* of performance for a specific separation. For example, if you wanted to recover 90% methanol from a charge containing 50% methanol, simple distillation would produce, at best, 65% recovery in a concentration of 60%, and your product would be subject to a certain amount of contamination. To remedy this, Pfaudler is able to guarantee recovery of over 95% of



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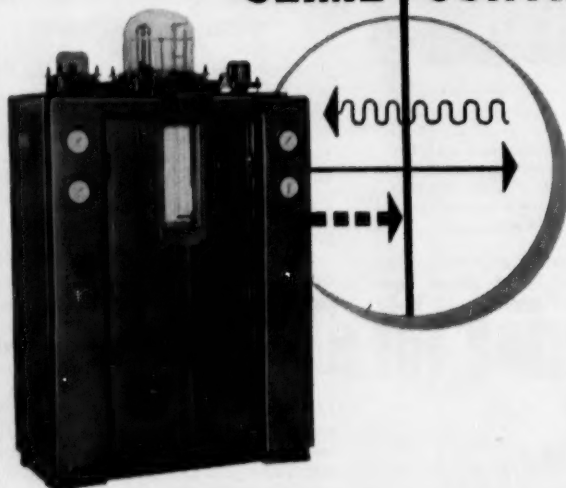
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B & I

• Over a five-day period, members of District 50, United Mine Workers, rejected and then accepted an 8¢ increase offered by Atlas Powder Co. at Atlas Point, Del.; and their acceptance will probably mean dropping of the suit to enjoin mass picketing of the 450-man plant.

• The Oil, Chemical & Atomic Workers (CIO) settled out of court a suit that had been filed against it by three of its own members at Houston, Tex. The three plaintiffs had charged that the union's contract with Shell Oil and Shell Chemical prevented them and other Negroes from bidding for certain higher-paid job openings. Settlement involved making an agreement with Shell to the effect that any employee with plant seniority and other qualifications will be eligible to bid for better jobs.

KEY CHANGES. . .

Alvin M. Weinberg, to director, Oak Ridge National Laboratories (Oak Ridge, Tenn.).

John P. Borda, to general manager, Magnus Metal Division, National Lead Co. (New York).

Clifford Sizemore, to vice-president, Pittsburgh Coke & Chemical Co. (Pittsburgh, Pa.).

T. M. Martin, to vice-president, **Jeff Davis**, to assistant secretary, and **E. W. Atkinson**, to assistant treasurer, Monsanto Chemical Co. (St. Louis).

G. H. Benham, to director, research and process development, American Agricultural Chemical Co. (New York).

John Bowles, to president, Rexall Division, Rexall Drug Co. (Los Angeles).

August Belmont, to director, The Chemstrand Corp. (Decatur, Ala.).

Laurance S. Rockefeller, to director, Olin Mathieson Chemical Corp. (New York).

KUDOS

To **Dean A. McGee**, the Southern Assn. of Science and Industry "1955 Distinguished Service Award."

To **Miles A. Dahlen**, the American Assn. of Textile Chemists and Colorists "1955 Olney Award."

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SQUIBB'S BROWN AND KROLL: In miniature fermentors . . .

They Trade Size for Savings

Running a fermentation in a flask is fine for producing small quantities of product. But it doesn't tell very much about how the process will behave in production equipment. To minimize costly and cumbersome trials in full-scale process equipment, fermentation researchers are turning to small, 20- and 30-liter vessels and proportionate-size accessories.

On the whole, the effort is proving successful. Progress in coaxing meaningful process data from these miniatures is reported by more than a dozen investigators.*

Their work, plus that of like-minded researchers in other industrial and academic laboratories, is rapidly filling out the blueprint of the new small-scale fermentation technology.

Nub of the trend is embodied in the compact setup of Upjohn's H. A. Nelson, W. D. Maxon and T. H. Elferdink. They rely on a 20-liter unit equipped with control instruments, a 150-1,500-rpm. agitator and internal accessories (fixed on tank heads) that can be used to simulate full-scale setups.

The diminutive apparatus even contains an automatic foam-control system that squirts a dash of antifoam

agent when bubbles contact a sensing probe.

Results garnered with this equipment strongly support the value of small units for predicting a process's full-scale operating characteristics. Case in point: yields of penicillin G are almost identical with those obtained from production equipment, all other things being equal (inoculum, procedure, pH, etc.).

It's difficult to ascertain the savings accruing from the use of scaled-down layouts in research and development. But the capital investment required to get into this work is one item of cost on which data is available. Abbott Laboratories' Waldo Friedland, Merlin Peterson and John Sylvester report that their 12 fermentors (30-liter, type 304 stainless steel cans plus frames and accessories), and two water baths cost about \$10,000.

These units are playing an important role in submerged fermentation studies at the company's North Chicago, Ill., laboratories.

Like their full-grown counterparts, Lilliputian fermentation units present problems. Solutions, however, are not always the same in both cases. Small, canlike fermentors may be autoclave-sterilized, whereas production equipment is usually rendered microbe-free by the introduction of steam.

Aeration, in a unit described by C. L. Kroll and W. E. Brown of Squibb Institute for Therapeutic Research, is accomplished by means of a sparger loop. To preclude broth losses due to evaporation, air is 95-100% saturated with water vapor, carried in lines heated to minimize condensation. If such precautions are not observed, evaporation could account for broth-volume losses of about 10%/day.

Rift: Advantages of portable vs. stationary equipment is currently rifting the ranks of the small-unit adherents. Portable types, according to their critics, make sampling difficult, lose comparatively large amounts of fluid via evaporation, are harder to heat uniformly, and require more labor than stationary units. The latter, on the other hand, are said to be more prone to contamination.

But this drawback of stationary apparatus is felt to be overbalanced by closer resemblance to standard production equipment; assembly time and maintenance, for example, is reduced by having all accessories connected on the cap.

In general, small-scale fermentors owe their effectiveness to their matching production models in all details but size. With reduced costs as a potential reward, elucidation of other secrets of success will probably stir a swirl of miniaturizing experiments for some time to come.



ABBOTT'S SYLVESTER: For submerged studies, available costs.

*Who took part in the recent 128th national meeting of the American Chemical Society, Minneapolis, Minn.

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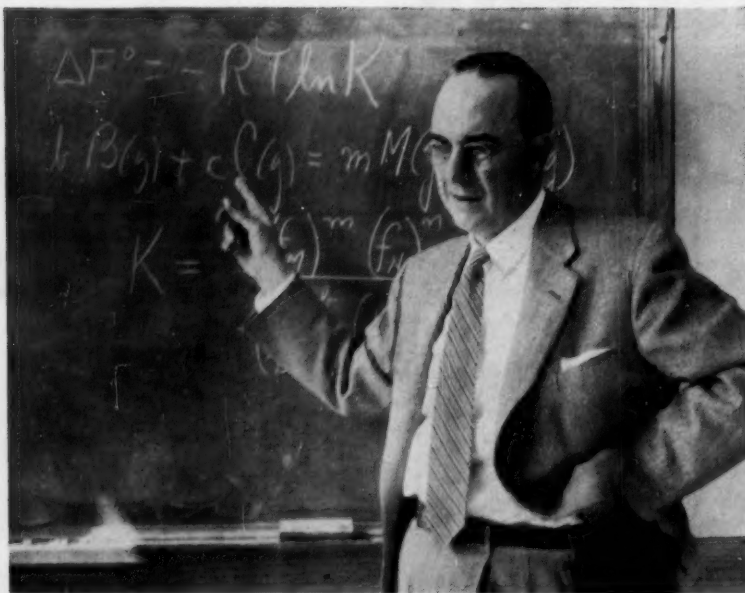
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CARNEGIE TECH'S ROSSINI: For paraffins, a new way to winnow.

Hydrocarbon Separator

This week, a new method of winnowing desired components from hydrocarbon mixtures had petroleum researchers registering more than a flurry of interest. The reason: it's the best way yet to separate paraffins—a long-time problem of oil analysts.

Deftly, the technique sorts branched-chain paraffins from cycloparaffins, mono- from cycloparaffins, and olefin-aromatic fractions from both paraffins and cycloparaffins.

Still purely an analytical tool, the method has captured understandable attention in the yield-conscious, application-minded petroleum industry. But its trio of developers, Beveridge Mair, Monty Montjar and Frederick Rossini, of Carnegie Institute of Technology's (Pittsburgh, Pa.) Petroleum Research Laboratory, reports that no economic studies have been made as yet to determine its commercial potential.

An outgrowth of long-lived (since 1934) project 6, sponsored at Carnegie Tech by the American Petroleum Institute, the method is now proving its mettle in the project's fundamental purpose—separation and purification of the multitude of hydrocarbons existing in crude oil.

An adsorption process, it's based on the principle that fractionation takes place in the presence of two added

components—one in the adsorbed phase and one in the liquid phase. It's a variation on the now widely used "partition chromatography" fractionation first reported by England's A. J. P. Martin and R. L. M. Synge* in 1941.

To separate paraffins from cycloparaffins, the API researchers use silica gel in the adsorption column, pretreat it with either ethylene glycol monomethyl ether or diethylene glycol monomethyl ether. Mixed hydrocarbons are added to the column and allowed to completely enter the adsorbent. Either heptacosafuorotri-butylamine or perfluorocyclic ether (Minnesota Mining's No. N-43 and No. O-75, respectively) is then added to induce the separation.

Operation Note: Best results are obtained by keeping the system at or slightly above the temperature required for complete miscibility of the paraffin in the fluorochemical. Room temperatures may be too low.

Regardless of any commercial significance it may have, the novel scheme seems assured of a long tenure in analytical circles.

* Martin and Synge separated acetyl-amino acids and amino acids in their pioneer effort, used a silica gel column as carrier for the solid phase and a variety of organic solvents (wet chloroform, butanol-chloroform, propenol-cyclohexane, ether-ligroin, etc.) for the liquid phase.

Sludge Control

Bane of home heating oil and diesel fuel users (who have upped their consumption 91% since World War II), fuel sludge plugs filters and lowers flame efficiency. Formed during storage by chemical reactions induced by changing temperatures, the sediment hasn't hitherto been easy to either predict or combat. This week, however, a new test had refiners envisioning an end of the problem.

Featuring greater speed and accuracy than previous tests of its kind, the newcomer quickly turns up fuels that are potential sludge-formers, aids greatly in fuel quality control. Essentially, it consists of heating a sample of oil at a controlled rate for 16 hours to accelerate sludge formation (if any), cooling the oil and drawing it through a felt filter pad at a constant rate. The oil's sludge-forming tendency is determined by measuring the pressure drop across the filter, by visual examination of the filter, and by weighing the collected sludge.

According to its developers, who include Esso Research and Engineering Co.'s (Linden, N.J.) T. Stanford Tutwiler, William Konrad and Matthew France, together with Esso affiliate Imperial Oil Co., Ltd. of Canada's Norman Shipley, the test provides a fuel rating that has already proved its merit in foretelling fuel sludge formation under actual storage conditions.

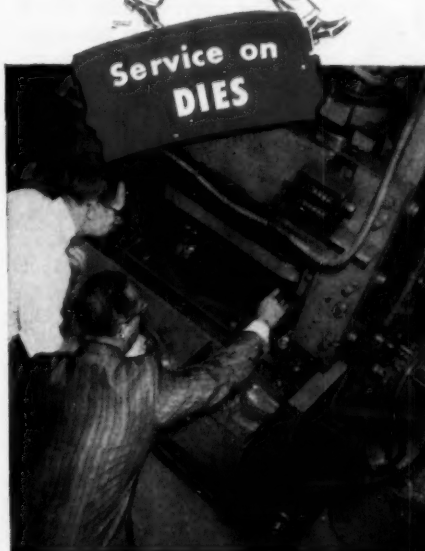


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RESEARCH

New Faces: These new products appeared on the scene last week:

- **N-(2-hydroxypropyl)ethylenediamine** became available in pilot-plant quantities from Wyandotte Chemicals (Wyandotte, Mich.). Tradenamed **Monolene**, the compound shows the chemical behavior of alcohols, primary and secondary amines. Potential uses: in the synthesis of dyes, insecticides, resin intermediates and cationic surface-active agents.

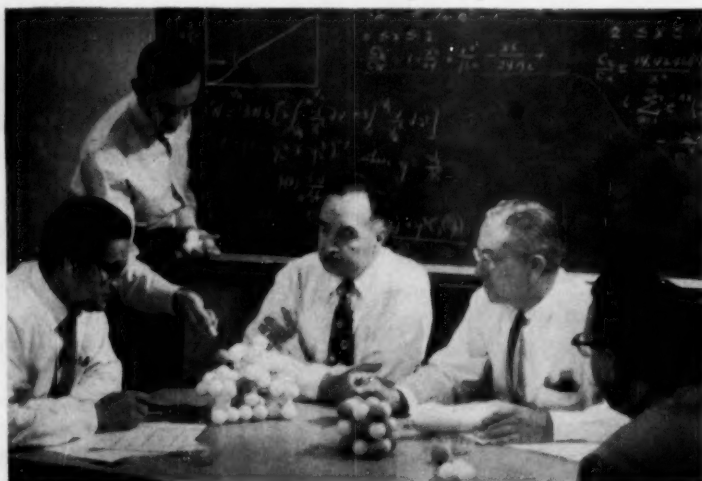
- **Dihydrocholesterol** (3- β -cholestanol) is offered in limited quantities by Winthrop-Stearns' special chemicals division. A biochemical research tool, the product was recently discovered to be an antimetabolite for cholesterol (i.e., it decreases the amount of cholesterol in the blood and organs of laboratory animals). This finding is behind the recent surge of interest in the material. Cost: \$150/kilogram; \$18/100 grams.

- **Thioacetamide**, intended to serve as a replacement for hydrogen sulfide

in analytical work, was launched in a new 98.5%-form by Fisher Scientific. Exclusively a reagent, it is said to offer an effective alternative to hydrogen sulfide's toxicity and odor. Cost: \$2.65/oz.

• **Building Tally:** The first of three major units in Battelle Memorial Institute's new atomic energy research center was recently completed. A "hot" cell laboratory, the initial unit is part of a building program that eventually will provide \$3.5 million worth of nuclear research facilities on a 400-acre site just west of Columbus, O. Second unit of the new center—a power-reactor development laboratory—is scheduled for completion later this year. A swimming-pool-type research reactor, designed by American Machine & Foundry, is the heart of the third unit.

• Now in operation at Toledo, O., is the recently commissioned Owens-Illinois technical center. A two-story



Ping-Pong Atoms and Color TV

STAFFERS of Owens-Illinois Glass Co. find ordinary ping-pong balls an aid to understanding the structural complexities of glass. The pile of balls on the table (left) in the company's brand-new \$5-million Toledo, O., research center (see above) depicts the random arrangement of atoms in glass.

Missing is the order associated with the atomic structure of salt, represented by the cube of balls (center). Studies of this kind underlie such developments as a new low-temperature solder glass that—according to Owens-Illinois—is expected to slash the cost of color TV sets by as much as 50%.

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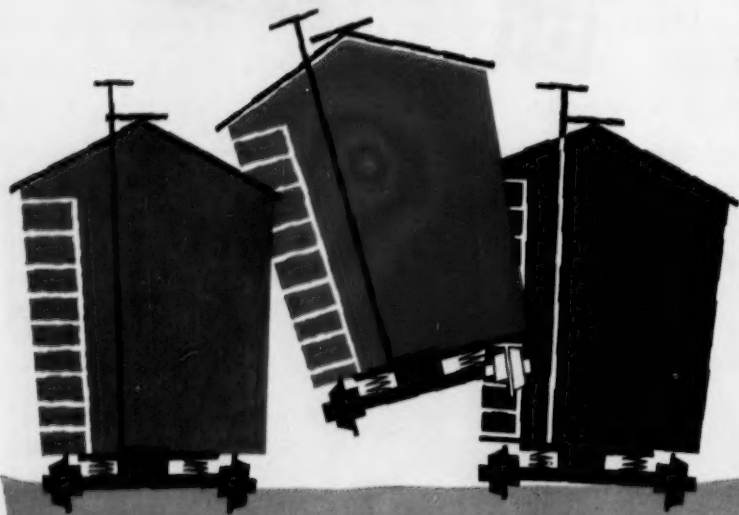
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RESEARCH

brick-and-aluminum structure, occupying 8 acres of a 21-acre plot, the new research center provides the company with nearly 200,000 sq. ft. of floor space for glass studies. Of this, 44,000 sq. ft. are taken up by (50) laboratories and 70,000 sq. ft. are devoted to pilot-plant work. Remaining area is used for offices, libraries and other auxiliary facilities.

- At the same time, L.O.F. Glass Fibers (Toledo, O.) revealed plans for a new research center near the firm's (Waterville, O.) textile yarn and bonded mat manufacturing plant. The addition will contain laboratories for plastics research and glass testing, in addition to executive offices and a library.

- A new \$500,000 pilot plant on the site of its Cincinnati research facilities was completed last week by U.S. Industrial Chemicals (division of National Distillers Products). Dimensions: a two-story general section provides 2,800 sq. ft.; a three-story special section comprises 4,300 sq. ft.; four floors of air-conditioned offices and laboratories total 3,600 sq. ft.; and a basement has 4,000 sq. ft. for machine shop, boiler and air-conditioning. First product to be piloted in the building will be isosebacic acid.

- Out West, Crown-Zellerbach officially opened its new central research laboratory last fortnight. Aside from traditional research activities of the company, the \$600,000 structure will house the work of the new chemical products division. Seventy people staff the 24,000-sq. ft. facilities.

- **Research Chemical:** Small quantities of orotic acid, a physiological substance involved in the biosynthesis of nucleic acids, are newly available from Mann Research Laboratories (New York).

- **Ceramic Hopefuls:** Several new lead-oxide-base piezoelectric ceramics, developed by Bureau of Standards, appear commercially promising. Featuring good electromechanical properties and stability over a wide temperature range, the compositions (particularly in the lead titanate-lead zirconate series) could prove useful as transducers in sound detectors, sonar equipment, velocimeters, and strain and pressure gauges, and may, says the bureau, "replace barium titanate in many commercial applications."

CHEMICALS OUTLOOK

October, 1955



This news bulletin about Wyandotte Chemicals services, products, and their applications, is published to help keep you posted. Perhaps you will want to route these and subsequent facts to interested members of your organization. Additional information and trial quantities of Wyandotte products are available upon request . . . may we serve you?

SAVE WITH WYANDOTTE'S ANHYDROUS CALCIUM CHLORIDE PELLETS

Calcium chloride in pellet form is now available from Wyandotte in unlimited quantities. Pellets are anhydrous . . . they contain 94-97% CaCl_2 compared with the 77-80% CaCl_2 content of regular flake. Consequently, only four 100-lb. bags of pellets are required to accomplish the same result as five bags of regular flake.

Pellets can be shipped in 100-lb. waterproof bags, or dry in bulk -- in hopper cars or tank cars. When shipped dry in tank cars, they can be unloaded by merely pumping in water and pumping out concentrated calcium chloride solution. When shipped dry in hopper cars, they can be unloaded from the bottom and mechanically conveyed to tank trucks and storage facilities. Stored in bulk -- in convenient silos -- pellets maintain their normal free-flowing characteristics.

Wyandotte pellets can be used wherever flake calcium chloride is used . . . and at a saving in most areas. They can also be rapidly dissolved in any type of container. In most applications, pellets may be used with standard equipment.

Here are some of the many advantages you can gain through pellets: 20% less product does the same job as flake; pellets can be shipped in bulk -- which eliminates bagging costs, and bag-opening costs . . . lowers storage charges . . . saves time and labor in handling . . . and effects substantial transportation savings.

Wyandotte Calcium Chloride is available in pellet, powdered, flake, and liquid forms, and in various sizes of lump (94-97% CaCl_2) or broken solids (73-75% CaCl_2). For prices, technical data, handling and storage information -- or bids on your requirements -- address your inquiries to Department CO for prompt attention.

A NEW ALKANOLAMINE

Monolene,* a new organic product -- N-(2-hydroxypropyl) ethylenediamine -- is now available in pilot-plant quantities. This new "water white" liquid will be of interest to those concerned with reactions involving primary and secondary amine groups, as well as secondary hydroxyl groups. Monolene may be used in the production of cationic surface-active agents and resin intermediates. Other possible applications are: in the production of dyestuffs, textile-finishing compounds, insecticides, oil additives, etc. Write for data and a laboratory sample.

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LARGE GAP: Lack of data makes it hard for engineers to specify materials, is one of the big . . .

Missing Links in Cellar-to-Roof Plastics

Confusion reigns among builders and manufacturers as plastics ballyhoo, lack of information, forces specifiers to shy away from using plastics in their designs.

Coordination, leadership, say industry people, is the big need now, but who will supply it? A few firms are now looking for the answers.

Optimists looking for the practical plastic house shouldn't hold their breaths in anticipation: it's a long way off. Plastics in building haven't made much progress, probably won't until some basic problems are solved, according to a consensus of resin producers. But today they see hopeful signs on several fronts.

Problems are big, but so is the potential. Plastics have made some headway in housing since World War II, have breadth but not depth. Today they are used in a variety of applications ranging through almost all parts of buildings from wall to wall. Despite this breadth, however, plastics

took only \$224 million out of 1954's \$35-billion building business, are scheduled to derive only \$240 million from the \$36.8-billion trade estimated for 1955. That's less than 1%—a mighty small slice.

But selling the builders is destined to be a big job, for the industry faces three distinct problems: developing communications, collecting and evaluating data, overcoming resistance and apathy.

In many respects the three are interwoven. Boiled down, they indicate that plastics people don't know enough about building, builders don't know enough about plastics.

Meeting of Minds: Closest the two industries have come together was last year's Plastics in Building Conference in Washington, D.C., where for the first time members of both groups sat down to talk things over. Like Frenchmen and Turks trying to converse in Esperanto, communication was sticky—and things haven't gotten much better. Plainly speaking, the plastics industry needs to find out how the architect, engineer or contractor thinks, and what he's looking for in engineering materials.

By and large, the chemical industry has been looking at plastics from the viewpoint of chemistry rather than as building blocks. But Monsanto Chemical not long ago got together with M.I.T. to look into the future from the latter coign of vantage. The result: a publication, "Plastics in Housing," which presents a detailed analysis of each of the major plastics in terms of its present and possible future ap-

STABILITY UNDER FLORIDA SUNLIGHT			
	VINYL RESIN 100 Parts DIOCTYL PHTHALATE 50 Parts LEAD STABILIZER 3 Parts	VINYL RESIN 100 Parts DIOCTYL PHTHALATE 50 Parts CADIUM-BARIUM STABILIZER 1 Part	VINYL RESIN 100 Parts DIOCTYL PHTHALATE 25 Parts PARAPLEX G-62 25 Parts CADIUM-BARIUM STABILIZER 1 Part
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400 SUN HOURS			
600 SUN HOURS			
800 SUN HOURS			
1000 SUN HOURS		DECOMPOSED	

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The stabilizing effect of PARAPLEX G-62 in vinyl compounds was dramatically demonstrated during recent tests under intense Florida sunlight. The samples shown here were exposed for periods ranging up to 1000 sun hours. The improvement imparted by PARAPLEX G-62 is clearly shown by the exposed samples.

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INNOVATION, like umbrella roof, may broaden use of plastics.

plications in a theoretical house.

But this is only one contribution to the over-all communications problem. Still needed, according to Du Pont, are some conceptual approaches that will require close cooperation between chemical men and building people. Plastics, Du Pont points out, have been thought of too long as suitable or unsuitable on the basis of a specific property or lack of it. Each plastic, the company says, should be thought of as a constellation of properties, the over-all effect of which suits it for a particular application.

It follows that architects must learn more about plastics. One engineer puts it this way: "Instead of discarding the idea of a plastic two-by-four because it won't hold up a conventional roof, we need to develop a plastic roof the two-by-four can hold up. This approach can be extended to all phases of building."

Such a view doesn't mean that plastics makers are out to substitute their products across the board. Rather, they want to make efficient use of them in conjunction with other materials. How to do this is again a matter of finding out what the builder needs. Allied Chemical & Dye Corp., whose Barrett Division is working intensively with reinforced polyesters, indicates that this will take years, has 100 men in the field reporting on needs that should pay off in the future.

Off in All Directions: In spite of the scattered shots being taken by individual companies, uncertainty is

paramount, group effort necessary. E. M. Lindforth, research architect at Rohm & Haas' Bristol, Pa., plastics laboratory, summarizes: "It is apparent that increased educational efforts must be made by the plastics industry as a whole . . . So far as plastics are concerned, architects and builders commonly enjoy a state of bewilderment. Not all architects, of course, nor all builders, but most of them. This has come about because of the constant flow of new plastics materials and the ballyhoo about them, in which it is difficult to distinguish the valid applications as building materials from the irresponsible proposals intended to 'stimulate the thinking of architects.' As a result,

many architects are retreating in confusion, and builders, when plastics are specified as an alternate building material, are likely to favor the traditional material."

Only Part of the Answer: But developing a "plastitext" or "archiplast" who is conversant with both fields is not the whole solution. He must be supplied with facts and figures. As yet, little has been done to collate sound data for application to building.

Builders are naturally a conservative lot when it comes to specifying materials: they don't want their buildings to fall down. Right now specifiers are chary of calling for plastics, are worried about how they'll stand up.

They need data, but what scanty information is available is difficult to find. Several plastic encyclopedias present accurate and authoritative qualitative discussions plus correct performance charts. But the latter are of most use to fabricators and processors rather than to such ultimate users as builders.

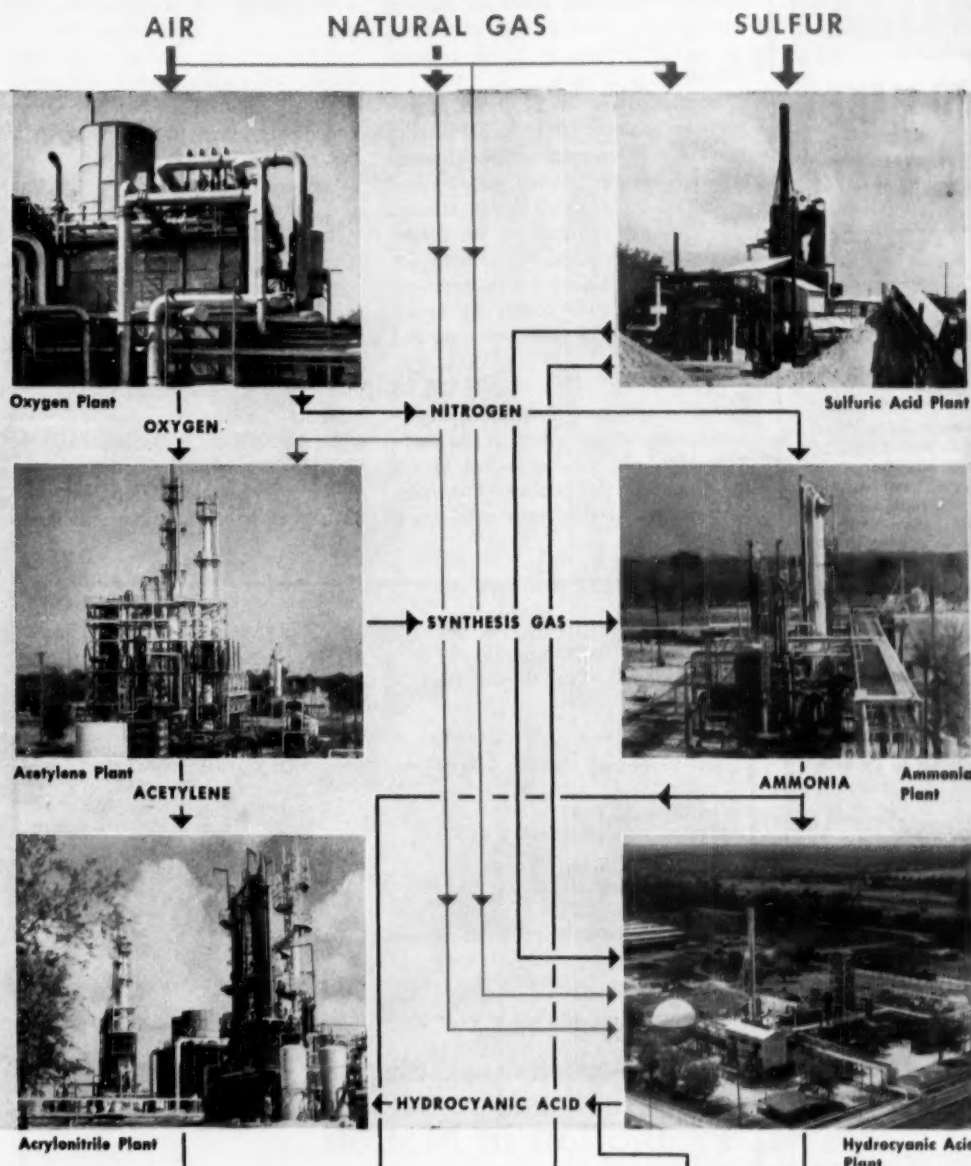
One of the traditional symbols of the architect is the ever-ready handbook of materials, which in many cases includes precalculated data for almost any standard dimension and type of material. The builders are still looking for one in plastics.

Not that the need is going unheeded. Monsanto, for one, is driving hard with its structural plastics engineering group. By trial and error, says Mike Gigliotti, the new group's manager, Monsanto will seek to learn what plastics can properly do in the

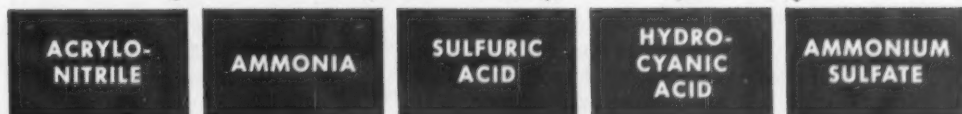


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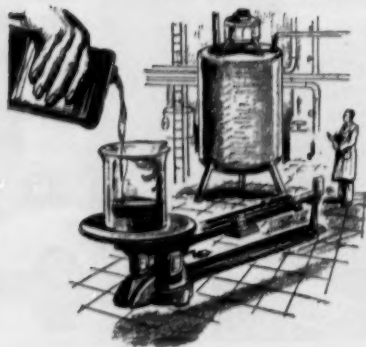
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building field, will make its findings available to other plastics producers, to architects and to builders themselves.

Studies under the \$250,000 project will aim to uncover needs that plastics can fill in residential, industrial, commercial and institutional building and in heavy engineering. It will attempt to delineate applications of plastic products to those needs, promote acceptance of the products by engineering standards, will follow up to assure performance of recommended materials.

Lack of data is not wholly the industry's fault, even though it has generally been slow to work on the problem. Much of the lag is due to the rapid growth of plastics. Producers have moved swiftly into production

with a variety of materials to satisfy the demands of processors who have had little trouble marketing relatively simple products. Result: not much time has been devoted to heretofore-unnecessary complexities, like statistics.

Solution of the data problem will go a long way toward putting plastics in building, Rohm & Haas says, provided the manufacturer, fabricator and processor make themselves and their service known to the builder so he'll think of them—as he does his sheet metal man or other suppliers—when plastics are specified.

Better communications and data will help materially in breaking the third problem—apathy and resistance. There isn't much question that plastics got off to a bad start in the post-



Promotion in Motion

CHICKENS may come home to roost, but plastics come back to serve. Rumbling over concrete and asphalt roads between Elizabeth, N.J., and Detroit, Mich., this week are three of these newly fabricated, glass-reinforced polyester plastic truck trailers of Reichhold Chemicals. By such example—and by using its own polyester materials in the construction—the company hopes to prove that plastics have a place on the turnpike.

But not for promotion alone does Reichhold truck its resins, indus-

trial chemicals and dry paints in plastic trailers. The 32-ft.-long bodies are 1,200 lbs. lighter than a comparable aluminum model, and thin plastic walls provide a bit more cubic space. Painting isn't required, and hosing down (with no fear of rust) suffices to clean laminated resin-coated plywood interiors. A glass-wool layer on the walls protects prerefrigerated shipments from heat.

It's Reichhold's hope that lower trucking costs—and its own example—will hike plastic sales.

Briefs

from Recent Literature

Ethylene Oxide

Organic esters, useful as detergents and where slight acidity is desired without corrosive attack upon metals, as in metal pickling baths and in the removal of milkstone from dairy equipment, are prepared using lower alkyl-, carboxymethyl-, diethers of polyoxyalkylene glycols as intermediates.

Anti-foaming agent, effective for aqueous media in pressure boilers operating at 200 p. s. i. and above, is a diether reaction product of straight-chain 1:12 octadecanediol and ethylene oxide, in a 1:18-25 molar ratio, in the presence of an alkaline catalyst.

Regenerated cellulose films and sheets are given excellent slip characteristics and prevented from sticking together, even under pressure and elevated temperatures, by impregnation in the gel state with an ethylene oxide-stearic acid condensation product in combination with glycerol and colloidal silica.

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These developments are abstracted from recent publications or U. S. patents. They may suggest applications of Ethylene Oxide in your products or processes. Permission to practice inventions covered by unexpired patents can be given only by the owners thereof.

Jefferson's products are offered with the understanding that the user will make his own tests to determine their suitability for his purposes.

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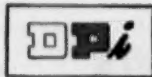


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DISTRIBUTION

World War II days, were frequently misused. Largely through the combined efforts of the 950 members of the Society of the Plastics Industry (New York) much of plastics' poor reputation has been erased.

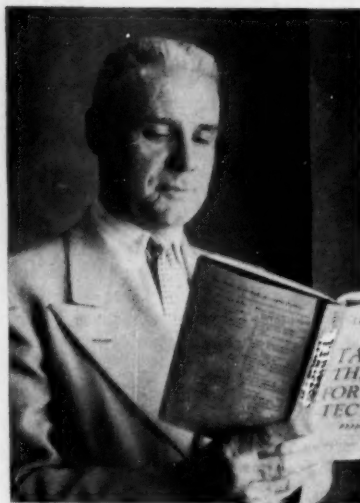
This is particularly true where plastics have gained a solid foothold—where processors and fabricators are fully aware of their properties. In untapped fields like building, there is still a resistance hangover. The burden of proof and development rests squarely on the plastics industry if it wants to sell in that market.

Another hindrance: archaic municipal building codes. Most municipal codes were written years before some of the newer building products appeared. Often they are specification codes, which actually state what types of materials may be used—a restrictive measure frequently prompted by conflicting interests. Performance codes, which normally specify only that whatever material is used must meet certain standards, are a little easier to work with.

Easier West: Certain parts of the country, says SPI's Code Advisory Committee, are less strict than others. Los Angeles, one of the few cities where plastics are spelled out in building codes, has become a model for other cities, such as Seattle and San Francisco. Rural and suburban areas are usually more receptive and these are key marketing areas. Once the suburbs are sold, it becomes easier for ideas to filter to the metropolis.

Building codes present still another problem: politics. To rewrite building codes usually requires a vote of a city council, whose members are constantly under pressure from labor groups. It is noteworthy that the use of easily formed, less costly, longer-lasting copper tubing in New York City has been before the council seven times, has been defeated every time. What would happen to plastic pipe under the same circumstances is obviously fairly easy to predict.

The industry recognizes that the problems are big—no question about it. What there is question about is, Who should work on it? Result: much of the industry is waiting for the other fellow to act first. Says one spokesman, "Until we start acting together, coordinating activities and providing the needed information, the practical plastic house will have to wait."



PROPHECY: More and more—that's what Dow's Lloyd sees . . .

Ahead for Sales

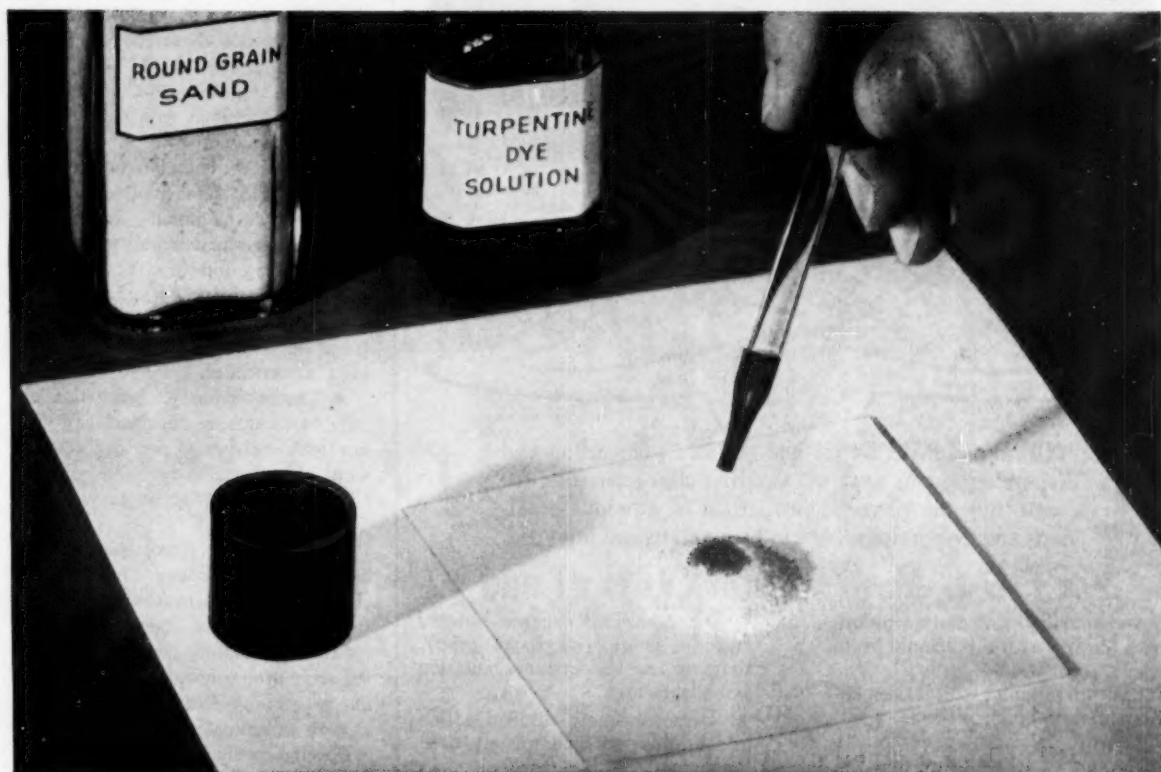
It's a rare blessing that doesn't bring along some problems. And rising chemical sales are certainly furrowing their share of sales managers' brows. Where do you get salesmen? How do you keep distribution costs in line? Many a company is hustling solutions, but future demands are always somewhat nebulous.

Bearing squarely on the topic is the actual extent of increased volume. Just the other week, Dow Chemical Co. Economist Lewis Lloyd used his market research as a telescope, told assembled attendees at the 360th session of the National Industrial Conference Board in New York where he saw sales in 10 years. Intensified distribution problems can hardly fail to result from prophecy fulfillment.

By 1965, said Lloyd, chemical and allied product sales (now at \$22 billion) will be crowding \$40 billion.* The dollar sales curve is now moving at 7%/year for inorganics, 10%/year for organics, 11% for plastics. Ten more years should double the amount of ammonia salesmen sell (to 12 billion lbs.), push chlorine up 67% to 10 billion lb. Twice as much formaldehyde, 50% more of glycols and 30% more phenol (by weight) as now will be written in order books.

And that's not all. "Synthetic detergents and wetting agents," Lloyd says,

* These predictions are based on the assumption of no major war, no mild inflation, no unfavorable government action relative to profits.



Grease resistance of Methocel-coated paper is tested by depositing a measured amount of tinted turpentine in sand on its surface.

Results of this test—a standard of the industry—are measured in time required for turpentine to stain the under paper.

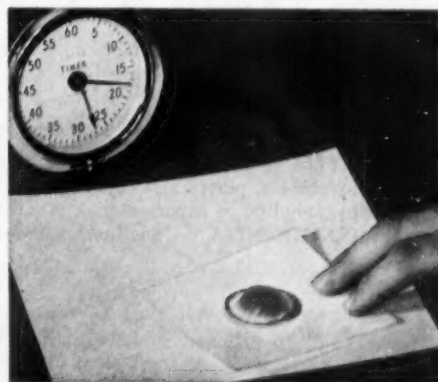
EFFICIENCY OF METHOCEL COATINGS PROVED IN GREASE RESISTANCE TEST

Paper sizing also affords a method of utilizing the film-forming properties of this cellulose gum

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The coated paper, bearing the sand, is moved at specified intervals to examine the sheet below for staining, as specified in test method T454m-44 (Technical Association of the Pulp and Paper Industry).

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DISTRIBUTION . . .

"should warrant a 70% further growth, plastics about 100% and synthetic textiles about 125%"—all in the next 10 years. Over-all, chemical sales should jump 100% with organics faring even better.

What's the foundation for this rosy view of 1965? Unexploited areas of chemical development weigh with mounting production and population:

- Building industry. The trend to lightweight materials (aluminum and magnesium) will spur plastics use in furniture, construction, insulation, and even automobiles.

- Textile industry. Synthetics are only now catching on. Special properties (fire resistance, porosity coupled with water repellency) and growing consumer familiarity augur well for man-made fibers.

- Agriculture. Here, the trend is already well under way. Chemical pest control should make tremendous strides. There'll be chemicals for defoliation, premature frosts, strengthening fruit drop resistance. And, there's the burgeoning demand for fertilizers, as well as animal growth aids.

Specific problems will, of course, hinge on individual cases. It seems clear, though, that sales managers have their work cut out for them if prediction matches realization.

For Your Information: Boron Carbide and Boron—16-p. brochure offers data on grades of boron and boron carbide, manufacture of the materials, properties, applications, and bibliography. Metal borides and boron nitride information is also included. Norton Co. (Worcester, Mass.).

- Ansul Chemical Co. (Marinette, Wis.) is now distributing two new technical bulletins. Properties of four ethers is the subject of one; dimethoxybenzene and hydroxyanisole are treated in the second.

- Packaging terms—second edition of a "Glossary of Packaging Terms" contains three times as many terms as the first edition, is now available at \$6.75. Packaging Institute (New York).

- Pacific Coast water traffic—31-p. booklet (supplement to the Aug. 55 issue of *Monthly Review*) analyses pattern of waterborne Pacific Coast foreign trade for 1953, presents detailed statistics. Chemical figures are included. Federal Reserve Bank of San Francisco.

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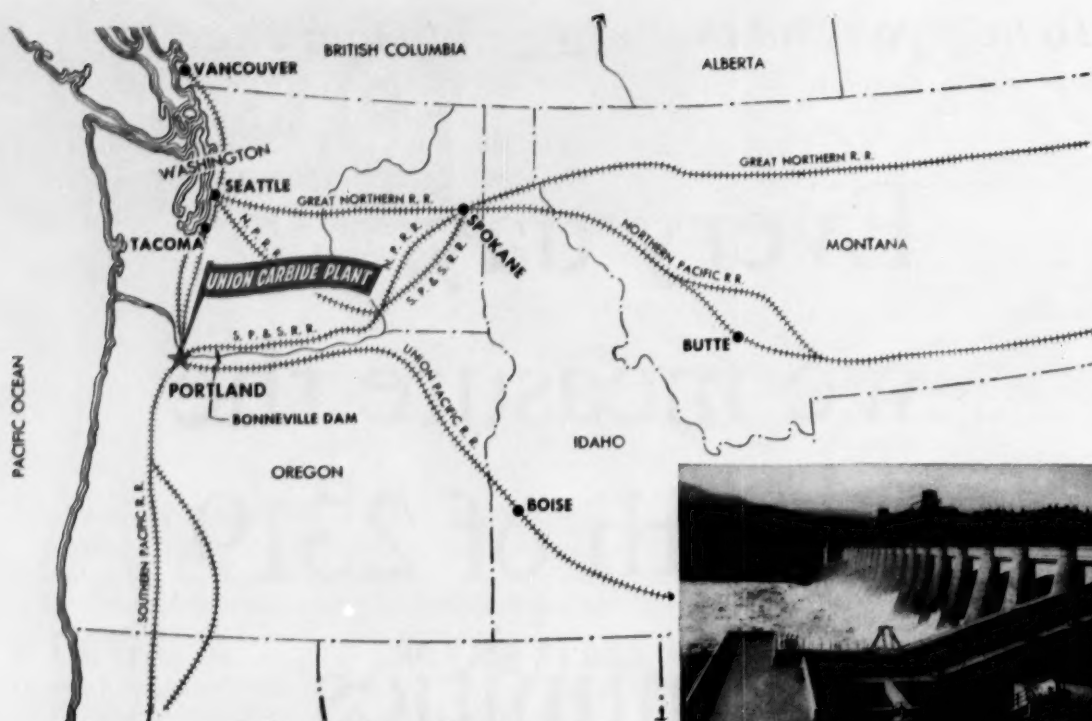
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For the Pacific Northwest... Volume Acetylene at Portland

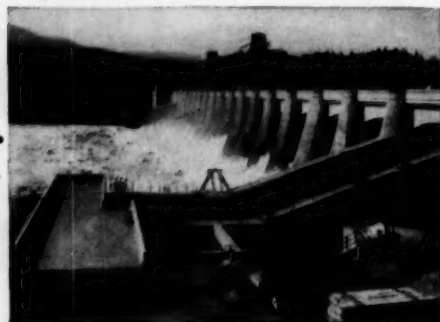
Acetylene—an important raw material for chemical synthesis—can be supplied in large volumes at Portland, Oregon. If you are planning a new chemical plant in the Northwest, and will use acetylene as a raw material, consider the advantages of having acetylene delivered directly by pipe line. No generation equipment is needed at your plant.

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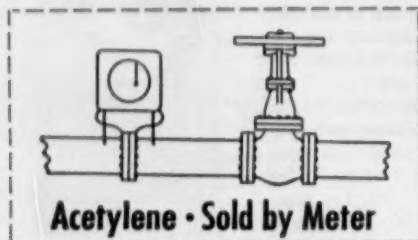
major railroads and a number of motor-truck lines serve the area. Portland also has the advantage of a deep-water harbor. Shipment of your products can be made by water between Portland and West Coast cities in the United States and Canada.

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UNION CARBIDE is also produced at Ashtabula, Ohio; Niagara Falls, New York; and Sault Ste. Marie, Michigan. Bulk shipments to chemical users can be made from any of these plants, including Portland. Drum stocks for industrial users are maintained at 111 warehouses throughout the United States.


Whatever your plans or requirements, you are invited to telephone or write to LINDE's CARBIDE-ACETYLENE DEPARTMENT for technical and sales information.



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SPECIALTIES



ROSE GARDENING: For 'available iron,' new basic-soil carrier chemicals.

Opening Up the West

Iron-chelating agents, effective in calcareous soils, promise to boom agricultural uses of these complexing agents.

Already, EDTA salts are selling at a 0.5-million-lbs./year rate in acid-soil areas (Florida, Eastern states)—new materials could open vast markets in the West and Midwest.

A new dyelike agent, several EDTA-related compounds, and a wood-waste complexing agent are among current hopes for these basic-soil uses.

Still hush-hush about its actual composition, and likely still a year or more from starting commercial production, Geigy Chemical Corp. can't help talking about its latest agricultural chelating agent,* APCA (or Fe 138).

The new product—a complement, rather than a replacement for now-established ethylenediamine tetraacetic acid (EDTA)—appears particularly well suited to use in calcareous (usually basic) soils. And it's these soils, common in the Midwest and West, that have offered the biggest challenge since chelates made agricultural news just three years ago.

While it is no secret that APCA is getting a lot of attention at Geigy, the firm is now fully commercial on another approach to problems of basic soils: Chel 330, under test for several years, will receive a strong

push soon, will be called Sequestrene 330 (chemically, it is diethylenetriamine pentaacetic acid; has been called DTPA).

And Geigy is certainly not the only firm to develop a chelate for basic soils. Here's a rundown of some of the other products now available for these problem soils:

- Crown-Zellerbach Corp. now has Greenz 26 in production at its Lebanon, Ore., plant (*CW, Newsletter, Sept. 3*). With a 4.5% iron content, it sells for about 25¢/lb., features low phytotoxicity, hence can be foliage-applied.

- Tennessee Corp. (Atlanta, Ga.) has a new product to add to its line of trace-element additives for fertilizers and direct home use. Called Nu-Iron, it is only partly a chelating agent, contains 30% iron.

- Glyco Products Corp. (New York) is now testing a product akin

to EDTA—it's called Ferralkine LS. The firm won't tell its exact chemical composition now.

- Dow Chemical Co. starts its second year with its commercially produced form of HEEDTA (or EDTA-OH), chemically hydroxyethyl ethylenediamine triacetic acid. It is sold as Versen-OL.

- Refined Products Corp. (Lyndhurst, N.J.) is also selling HEEDTA under the Permagreen Fe 135.

Little Things That Count: These new compounds are all part of the effort to simplify the fertilizing of plants with micronutrients. Far and away the major complaint due to minor-element shortage has been iron chlorosis—and while chelated forms of other trace elements are produced, first concern is with iron.† The EDTA has proved spectacularly successful in sandy, acid soils.

Estimates are that about 0.5 million lbs./year of EDTA are used agriculturally. Over a million citrus trees have been treated in Florida (at a rate of about ½ lb. chelate with 10-12% iron). Ornamental trees and shrubs are now probably No. 1 consumers of chelates in the West. In Florida, it's vegetables and citrus.

Geigy is likely the top supplier of the farm chelates (volumewise). Dow is generally credited with the No. 2 spot. Antara (with its Nullapons), Glyco, and Refined Products are also major producers of ag chelates.

Some home-garden fertilizers make use of the chelates; commercial fertilizers with them aren't readily available. Often, growers themselves mix the EDTA salts in with their fertilizers.

Double Trouble: Spectacular as has been EDTA's work in acid soils, application to calcareous soil hasn't proved so rewarding. True, 50-100 lbs./acre of EDTA would cure iron chlorosis for Western growers. But that's 10 times the dosage demanded by Florida soils—and at prices to bulk buyers of \$1.60/lb. and up, many orchardists have been scared off.

It was only in late fall of '53 that the reason for the poor functioning of EDTA was uncovered by agricultural scientists at UCLA. The problem was twofold:

† In the case of most tradenamed chelates for farm use, the element is made part of the name; e.g., Versen-OL Iron Chelate.

* Chelating agents are molecules able to hold or sequester ions in solution, so that they do not take part in many ordinary ionic reactions.

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SPECIALTIES

• Alkaline soils break down the EDTA.

• The clay content of the calcareous soils adsorbs the complex, makes it unavailable to plants.

Finding products more stable to alkalis hasn't taken long—HEEDTA is stable in alkaline Florida soils (though most Florida soil is acid, some in Eastern areas is basic). DTPA is another compound that withstands alkaline breakdown.

APCA, too, has shown itself far more stable than the early EDTA, and is seemingly unadsorbed by soil clay. Like the other stable chelates, it promises to bring complexing agents within reach of Western growers. (Because only pilot runs have been made, APCA cost has not been set by Geigy—undoubtedly, it will be considerably more expensive, on a pound basis, than EDTA compounds.)

Hot Stuff: Besides its shortcomings in alkaline soil, EDTA has the further disadvantage of being phytotoxic—causing leaf burn where it contacts foliage. This is true, too, of most compounds related to EDTA. As a result, EDTA is applied to the soil, although foliage spray might well be cheaper.

Greenz 26, a wood-waste material, is sprayable. A possible shortcoming—it leaves a sticky residue that some growers have objected to. Nonetheless, Crown-Zellerbach sees sales of about 100 tons in the coming season.

mainly for use by pear growers.

APCA, too, is nonphytotoxic. But it is a red dye, which limits its use on fruits, at least in the minds of many orchardists.

Hope for spray application has prompted considerable research by a number of firms for new chelating agents. Geigy, for one, has about six other compounds under test.

Broad Cropping: Citrus growers started using chelates first, and are still big customers. But other plants suffer the same micronutrient shortages. Home packages of chelates are widely offered for rose gardening (*see cut*), and trees and shrubs. Growers of basic crops like sugar beets, soybeans, and alfalfa will likely be using chelates, if current test programs pan out as hoped.

Among the chelated elements besides iron to command a market is zinc. Geigy sees grape growers using up to 50,000 lbs. of a Zn-EDTA soon. Applied to foliage, 2-3 lbs./acre, it has increased plant health, boosted yield.

All this should greatly expand the outlet for EDTA and other chelates. Currently, only a small fraction—a fifth or less—of the dollar volume for EDTA goes into agricultural products. The need is there, however, and optimistic chelate makers see the day when farm use of chelates can match or surpass industrial use.

NEW CHELATING AGENTS FOR NONACID SOIL

APCA

Also known as Fe 138, this new compound is a red, dyelike compound. APCA stands for aromatic amine polycarboxylic acid—not a very limiting description, but as much as manufacturer (Geigy Chemical Corp.) will say now. Still under test, it is not being sold commercially.

DTPA

Now commercially available, it has been tagged Chel 330 during experimental work; maker (Geigy) will market it now as Sequestrene 330. Chemically, it is diethylenetriamine pentaacetic acid.

HEEDTA

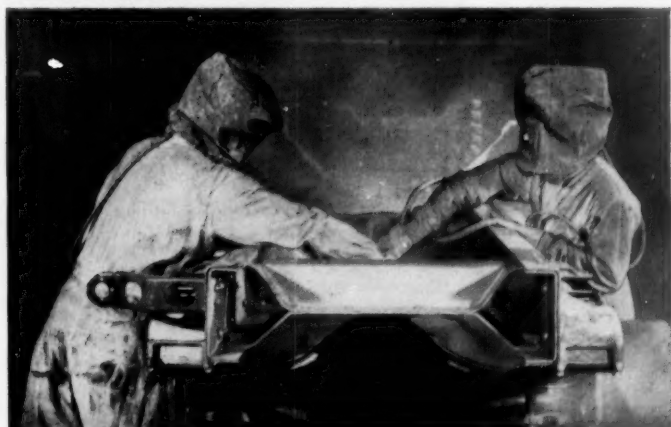
Also called EDTA-OH, it is sold commercially as Versen-OL (by Dow Chemical Co.) and as Permagreen 135 (by Refined Products Corp., Lyndhurst, N. J.). Chemically, it is hydroxyethyl ethylenediamine triacetic acid.

GREENZ 26

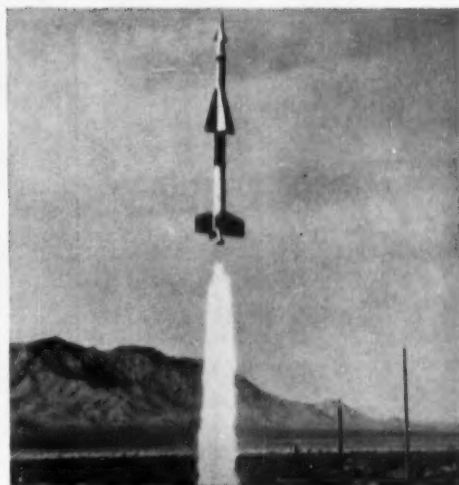
A lignosulfonate chelating material, it is in production at Crown-Zellerbach's Lebanon, Ore., plant. Big features are low cost and harmlessness to plants.



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SPECIALTIES

Locking in the Color

New decorative and industrial uses for Mylar film, as well as variations of old uses, are expected to result from a new process to dye the film.

Du Pont's polyester film has been making a place for itself in such applications as electrical insulation, packaging, industrial laminations, cap liners, drum liners, decorative panels, pressure-sensitive tapes, magnetic recording tapes (and recently as a sparkling yarn for weaving decorative fabrics). Its tensile strength (23,500 lbs./sq. in.), moisture and chemical resistance (to oils, greases, volatile aromatics), dielectric strength (4,000 volts/mil) and temperature resistance (within a range from -60 to 150 C) have made it an answer to many industrial and modern-living problems.

The dyeing process will permit the manufacture of films not only better adaptable to decorative use (by giving a more durable color than presently possible), but also better fitted to industrial "color-keying" application (example: different colored insulations for wiring).

Pink and Charcoal: The continuous dyeing method was developed by Martin Processing Co. (Martinsville, Va.), using special Du Pont dyes. All gauges (0.00025 to 0.0075 inches) of Mylar can be penetrated with a range of colors and shades ranging from pastels to black (including many metallic shades) which become an actual part of the film itself.

Claimed for the dyed Mylar:

- Lightfastness of many colors and shades, measured by the "Fade-Ometer," has been satisfactory even after 80 hours' exposure.
- Scuffing and abrasion problems are eliminated by the fact that color is an integral part of the film.
- The dyed film is heat stable.
- Matching colors and shades is easy.
- It can be redyed to darker colors.

Now most Mylar is colored either with lacquers or with pigmented adhesive coatings. In the new continuous penetration process, the film is dyed, washed in boiling soapy water, rinsed in clear water, then dried. If desired, it can then be vacuum-metalized.

Yarn Sandwich: The shiny new yarns can be made of dyed Mylar, too. As with plain Mylar, the colored material can be slit into narrow

widths and then woven into a fabric. To make a metallic yarn, the dyed film is laminated to both sides of a sheet of aluminum foil before slitting.

The most promising applications for the new colored material seem to be as decorative surfacing materials for automobile and airplane interiors, wall coverings, upholstery, table tops; and as decorative yarns in textiles. Matte and embossed finishes can be given the Mylar for either a soft appearance, or a slipproof wire insulation.

So far the new film isn't commercially available—the dyeing has been done on pilot equipment. Interested manufacturers can, however, receive up to several thousand yards for experimental purposes.

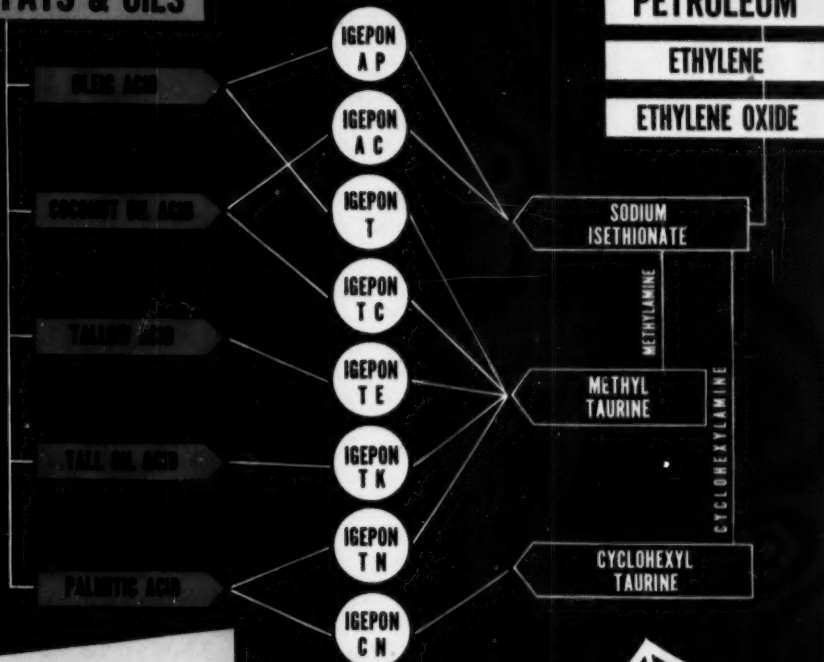
Against Wild Oats: A serious weed pest is the target of a research program in Canada. The Manitoba Agricultural Dept. will be looking for a wild-oat killing chemical in an intensive program over the next 12 months.

Dry-Cleaning Duo: A two-in-one product for dry-cleaners acts as both a sizing and a water repellent. Prim (Pennsylvania Salt Mfg. Co., Philadelphia) is designed to save cleaners storage, operating and materials costs.

Inside Look: A new glass aerosol compatibility tester, developed by Fischer & Porter Co. (Hatboro, Pa.), is adaptable to either the laboratory or production line. The glass construction makes it possible to tell visually if interaction has taken place between the propellant and the contents of the aerosol bomb, affords a quick test of the purity of each batch of propellant. The tester is made of heavy Pyrex glass, can be equipped with either the standard aerosol valve or a standard 1/4-in. Hoke needle valve. It may also be used to test spray and pressure characteristics. It is available as a 3-oz. tube or 6- or 12-oz. bottle.

Narcissistic Paper: Natural rubber and a copolymer of a butadiene-1,3 hydrocarbon and an acrylic nitrile provide the cohesive coating of a new self-sticking wrapping paper devised for Munising Paper Co. (Chicago) by John Hecktman. The sticking coat is applied to one side of the paper; a wax is applied to the other, according to Pat. 2,714,562.

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SPECIALTIES

Who Wants to Buy It?

It was specialties' day with the Chemical Market Research Assn. last fortnight. The program was built around the experiences—trials and success—of several major firms that have launched pioneering specialties.

Bill Dixon showed how Dow, for example, stepped into the consumer field with its Saran Wrap.

- The decision to launch Saran Wrap as a grocery store product came in 1948.

- To insure a reasonable return on investment, national distributors were by-passed, and a small firm was given the task of introducing the wrap. A four-year struggle convinced Dow that a real study of consumer likes, plus an education program, would have to be launched—so it tried a new marketing tack.

- After decisions on package size and type, price, etc., test-marketing was begun in 4 cities. Rapid acceptance there caused a move to 65 nationwide markets, backed with national advertising (with emphasis on television).

- Results: within two years of test-market days, the wrap made up 14% of all retail sales of wrapping material sold through food stores; it was on shelves of stores doing 85% of the nation's food business. After a brief slump, the current percentages have climbed even higher.

Customer Rules: Parker Frisselle detailed how Dow did some of its consumer research—finding out about size, package, price, rate of purchase, desirable (and undesirable) features, discovering the possible annual purchase rates, effects of income on purchase, and best types of advertising. Some of the specific research methods:

- In four test cities, door-to-door surveys were made.
- In-store interviews supplemented home surveys.
- Psychological interviews rounded out the picture of a typical consumer.
- A radio station conducted an audit among housewives in its specific area.
- A. C. Nielson store audits were made.
- Outside firms were engaged to make motivation studies—reasons for buying or not buying the product were determined.

Results again: this year, sales of

Saran Wrap are approaching 45 million rolls per year.

Although the Dow case history was given in greatest detail, several other significant and valuable case histories were narrated.

Paul Smith of Commercial Solvents Corp. told how his firm got into marketing antifreeze. R. P. Abouchar of Firestone also touched on the automobile specialties fields, discussing the market research necessary in tire, battery and accessory selling.

Antara Chemicals' Harold Shelton explained the ways, troubles and successes of his firm's venture in liquid dishwashing detergents. An old "soaper," Harry Wolfe, gave Colgate's views on market research on the soap and detergent field.

How does a firm with a product long established in the industrial field begin selling it to home gardeners? Frank Washburn of American Cyanamid told of the problems of interesting the growers in cyanamide for home use.

Aerosols, a sensation in the consumer market, didn't get that way without a lot of careful market research. Don McSorley of Du Pont outlined some of the long-range, detailed work that has made aerosols popular with both consumer and retailers.

There is a lesson to be learned from all these accounts—although these firms are in a financial class different from many specialties makers. Introducing a new product, for any firm, presents essentially the same problems, which often call for bold solutions.

Irregular Cases: A liquid plastic—Alfil—has been developed to repair irregularities in plastic molded cases. Allen Plastics Corp. (New York), maker of the transparent, fast-setting, waterproof repair, says it is also good for filling in the area between terminal poles and battery cases.

Handy in a Fix: Lab-Metal, an aluminum-base compound, is being sold to home handymen and industrial users as a general repair material. Sold in paste form, the material (main ingredient: aluminum pigment) is said to form a strong, permanent bond to metal, wood, plaster, glass, or plas-

BECCO Epoxidation

BECCO's In Situ Epoxidation process* is most advanced and low in cost . . . flexible in handling and results

Makers of pharmaceuticals, plasticizers, insecticides, surface-active materials and others, should become familiar with Becco's newest epoxidation process.

Reactions are highly flexible in terms of time and temperature. A wide range of catalysts may be used, including acids, ion exchange resins, alkane sulfonic acids and others.

Major economies are obvious for several reasons: (1) Yields are high, (2) Capital investment is low, (3) Product recovery is simple, (4) Hydrogen peroxide is used; preformed peracetic acid

is not needed, (5) Acetic acid requirements are low, (6) Short reaction times are possible.

Becco technical consultants — in the field or at our modern laboratories in Buffalo — will be glad to discuss the new Becco In Situ Epoxidation process. Write for special bulletins on epoxidation and hydroxylation or for Becco's complete list of bulletins on the use of peroxygen chemicals.

*Patent Pending

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IT FIGURES...



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Tests prove that shirts, pants, coveralls and lab aprons made of 100% DYNEL fiber last four or five times longer than comparable garments made with traditional fibers. DYNEL is unaffected by most chemicals; can be cleaned or decontaminated in acids — without harm; will not support combustion. It is washable, retains strength wet or dry, dries quickly. **YES, IT FIGURES.** You save because you get more for your money in 100% DYNEL work clothing. It's so long wearing that many laundries specify it for industrial rental clothing. To find out how much DYNEL can save in your operation, write us today. Dept. W.

Textile Fibers Department, Carbide and Carbon Chemicals Company,
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

SPECIALTIES

tic, and to dry to a hard, rustproof, waterproof, metalized surface. Uses include filling holes and cracks, building up a long-wearing finish on foundry patterns.

German Moly: Molykote lubricants (Alpha Molykote Corp., Stamford, Conn.) are now being made in a new plant in Munich, Germany, for an expanded European market, the company reports.

Less on the Side: A new antihistaminic product called Diafen (Schenley Laboratories, Inc., New York) claims two advantages: an unusually low incidence of side effects; it is the smallest-effective-dose antihistamine now marketed. Clinical studies indicate that Diafen is effective against hay fever, urticaria, angioneurotic edema and serum sickness. Technically, the new product is diphenylpyriline hydrochloride.

Silver Shiner: A silver polishing cloth that eliminates rubbing is the invention of E. R. Rushton, of Charlottesville, Va. Although not yet marketed, the cloth is called Rub 'n Rinse. A luster appears on the silver after it has been wiped with the cloth and rinsed.

Undercover: A bottom liner for garbage pails helps deodorize the pail, prevents the bottom from rusting, keeps residue from sticking. A flat, circular piece of asphaltlike material is impregnated with minute granules of stone saturated with pine scent, and backed with an adhesive impervious to water, acids and fats. The inventor, Harry W. Ketchledge, of Haddonfield, N.J., is looking for a manufacturer.

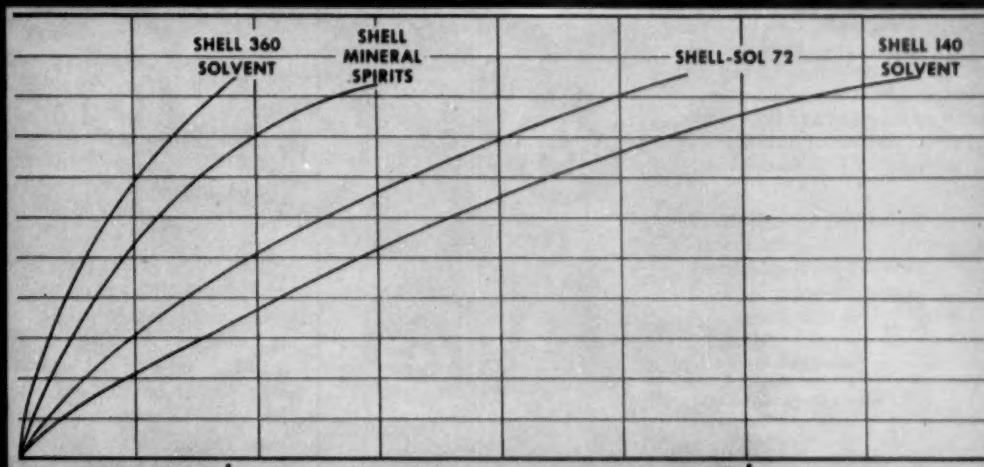
Data in Print: Thiokol Chemical Corp. (Trenton, N.J.) has issued a bulletin giving latest information on its vulcanizing agent VA-7. New compounding data on use for curing acrylonitrile rubbers, GR-S and natural rubbers is contained in this bulletin (No. 123).

• "How to Use and Apply Alloys and Fluxes for Soldering, Brazing and Welding Aluminum and Aluminum Alloys," a booklet by All-State Welding Alloys Co., Inc. (White Plains, N.Y.), describes two new solders, gives data on 14 others.

• Molykote type BR2, a general-

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... has no odor, is ideal for interior finishes, polishes and cleaners.

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... a slow drying, high boiling, high flash point solvent with a very mild odor.

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Detailed specifications of these Shell Solvents are contained in this booklet which will be mailed on request.



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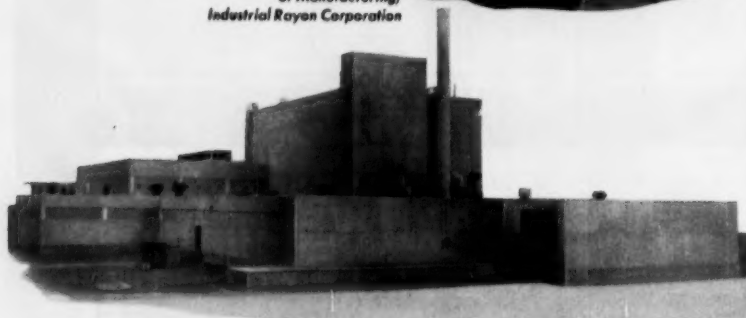


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"The impact of the man-made fiber industry on the nation's economy continues to become more important as new methods of manufacture are engineered and new applications are found for its products. Industrial Rayon Corporation is fortunate in having generated some of that impact through its development of the world's first continuous process for the manufacture of viscose rayon, by other contributions to the chemical and textile processing of fibers, and by increasing its productive capacity 160 per cent in little more than 10 years.

"We regard the recent expansion of our operations to include the manufacture of a new nylon staple fiber as another important step forward in the growth of our company."

I. T. Meyer,
Vice President in charge
of Manufacturing,
Industrial Rayon Corporation



Industrial Rayon Corporation's nylon staple fiber plant at Covington, Virginia, constructed by Ferguson

Ferguson built Industrial Rayon Corporation's modern nylon plant on schedule and within original money estimates. Construction proceeded simultaneously with detailed engineering, avoiding delay and expense to the owner. Ferguson maintained a rigid job schedule to meet Industrial's planned production date. A qualified staff of Ferguson planning engineers ensured coordination of purchases by owner and builder and deliveries were keyed tightly to construction schedules. Close supervision of field work was maintained at all times.

The speed of construction on this project, within the estimated cost, was the result of proper Scheduling, precise Measurement and Cost Control, and Ferguson's diligent Pre-planning and Methods Study...

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SPECIALTIES

purpose grease with extreme bearing-pressure properties, is described in a two-page bulletin issued by the Alpha Molykote Corp. (Stamford, Conn.). Test results, physical specifications, advantages and prices are given.

• Laqua, a coating for metals designed to preserve chemically cleaned surfaces, is the subject of a brochure by Fidelity Chemical Products Corp. (Newark, N.J.). Applications are pointed out in metal-working, electrical, and electronic industries.

• **Hard Pitch:** A new pitch designed to prevent softening and disintegration of bituminous concrete due to attack by oils, greases, gasoline, jet fuel and weather is now on the market. Available in three colors—charcoal, green and red—Meco Black Knight Surface Sealer (Maintenance Engineering Co., Philadelphia) is aimed at parking lots, driveways, service stations, etc.

• **Abbott Ads:** To promote home cooking uses for its Sucaryl, Abbott Labs is using consumer advertising for the first time in its 67-year history. Full-page 4-color ads will appear in Sunday newspaper supplements and other general magazines, featuring identical-looking desserts, one with Sucaryl, one with sugar, contrasting the calorie counts (22 vs 99, for example, in the first ad, a cranberry jelly).

• **Chlorine Control:** A bleaching and stripping additive called X-Tan-Assist is said to inhibit corrosion and odor caused by sodium chlorite, increase bleaching effectiveness as much as 50%. The Tanatex Corp. (Kearny, N.J.) product is claimed to control the formation of chlorine dioxide gas to the rate at which it is used in bleaching, and reduce consumption of sodium chlorite by a third. Other claims: it lessens surface tension of the bleaching bath, stabilizes any pH on the acid side.

• **Shine Maker:** Esso Research and Engineering Co.'s Dominick Russo and Henry Cooke have come up with a new auto polish (U.S. Pat. 2,716,610). The recipe includes an oil-soluble sodium or potassium petroleum sulfonate (0.1 parts); camphor oil (3 pts.); spindle oil (8.4 pts.); bentonite (2 pts.); and emulsifying agent (0.33 pts.); diatomaceous earth (12.50 pts.) and water.



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For textile treating, there's a better form of formaldehyde—Celanese Formcel* Solutions. These water free combinations of formaldehyde and a specified alcohol or glycol can skip two steps in the production cycle. But none of these is direct enough when processing requires formaldehyde gas. This calls for completely anhydrous Celanese Trioxane.

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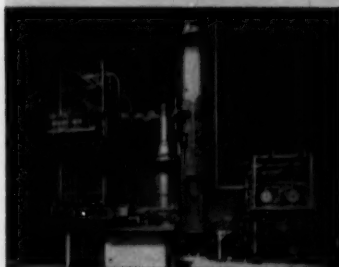


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- 9220-1 Electrical distribution system
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- 9220-3 Rerouting McMurrey Creek
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- 9220-5 Revisions to crude unit
- 9220-6 Refinery oil separators, blowdowns and flares
- 9220-7 Interconnecting process lines between units
- 9220-8 Storage and products lines from units
- 9220-9 Revamp #1 crude unit
- 9220-10 Revamp thermal cracking unit
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- 9220-12 Revamp fluid catalytic cracking unit
- 9221 New 8,000 BPSD decarbonizing unit
- 9223 New 10,000 BPSD crude unit
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1955 000
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June 22, 1955

SUBJECT: Blaw-Knox Company
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9221, 9223 & 9292
at McMurrey Refining
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Blaw-Knox Company
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Attention: Mr. E. S. Wright,
Manager of Construction

Gentlemen:

We wish to commend you and your organization for the high quality workmanship, labor relations, customer relations, job cleanliness and efficiency on our expansion and modernization program which was started in early 1953 and is now nearing completion.

Your Construction Superintendent, Mr. R. E. Squire, has co-operated with our engineering department and operating department 100% and is to be commended for cost-consciousness and labor relations; we did not have a labor stoppage in the two year construction and revamp program.

We extend the invitation to you of calling on us at any time for recommendations on Blaw-Knox construction and/or Mr. Squire's ability as a job superintendent.

Yours truly,

McMURREY REFINING COMPANY

M. H. McMurrey
M. H. McMurrey, President

MMH:bjf

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Market

Newsletter

CHEMICAL WEEK
OCT. 8, 1955

Don't look for any significant changes in the benzol market, at least through this last quarter of '55. Fact is, the current 36¢/gal. price may possibly hold well into next year. And that's surprising, considering the pressures building up on the general domestic quotations.

Biggest squeeze comes from the continuing influx of low-cost European material, which earlier this year, incidentally, toppled benzol from its 40¢ perch. Another uncomfortable pinch: increasing supply of both coke-oven and petrobenzene. (The former, of course, ties in with the present record-breaking steel operations.)

But here's the reason for a likely status quo: import volume, though bothersome, isn't too great; demand for domestic use (synthetic phenol, styrene for synthetic rubber, dyestuffs, etc.) is expected to remain good.

More important, bulk benzol buyers aren't actively agitating for lower prices, seem willing to go along with the current price since there's little or no talk of increases.

To a certain extent, the same can be said for toluol. Supplies are, and will indefinitely continue to be, more than adequate to cover all possible requirements. Already a specter of surplus is popping up here and there around the country.

Adding to this market overhang: material aimed for overseas selling is said to be piling up at some export points. Reason: European consumers are reportedly being offered bargain prices on foreign toluol.

But the domestic picture has its bright spots. The government is still in the market for both nitration-grade and avgas material; industrial demand, while not racing, is brisk enough to take up a good deal of the available toluol—a condition likely to be maintained throughout the remainder of the year.

•
There's going to be one less polyethylene film maker in the U.S. by the end of this month—Du Pont is stepping out. The 29 producers remaining, though, can turn out enough to fill this country's growing needs. Actually, Du Pont's polyethylene film operation at its Buffalo, N.Y., Yerkes plant is relatively small; hence cessation of commercial production there will not greatly affect total availability.

Future plans in the film field will stress new developments in cellophane (to keep pace with its currently expanding production facilities), and in Mylar polyester film.

The company, however, has no thought of relinquishing its role as a major polyethylene resin producer.

•
Speaking of cellophane, Du Pont is the only big maker who has not as yet advanced prices—but the word may be out within a few days. Following American Viscose's earlier move, Olin Mathieson late last week increased its prices an average of 5%. Affected is merchandise shipped after Oct. 31.

•
Not all ammonium sulfate producers have yet swung into line with a retroactive price protection deal for customers, but the practice will undoubtedly become general before long. Consumers have been pressing for such coverage for months, have backed their demands with, literally, hand-to-field buying.

Here's how the system works: if ammonium sulfate tags drop, buyers will receive a credit for all material on hand (including that contained as an

Market Newsletter

(Continued)

ingredient in mixed goods). The price protection period: July 1, '55 through March 31, '56.

Prices on shipments of sulfate this month and in November bear a \$1/ton discount—part of the "bargain" rates posted in June—but from December on, quotes go back up to the \$42-47.50/ton base (depending on point of origin).

The new protection deal, plus the current discount, underscores sellers' hint to purchasers: buy now with confidence—and save.

Another probable problem for laggard domestic fertilizer buyers is an anticipated spurt in export activity. Recent shipments to Korea, India, and elsewhere have cut into available coastal supplies of synthetic sulfate.

Some coke-oven sulfate, too, has been moving out of inland stocks to overseas customers.

Now fertilizer marketers are contemplating additional tenders from Pakistan and Korea; and there should be others.

The paint materials market is in a stirred-up state. Some lead pigment prices are higher, for example, reflecting the $\frac{1}{2}\phi$ /lb. boost in the lead metal price. Dry red lead, litharge, and orange mineral, all up $\frac{1}{2}\phi$, will now cost 18 ϕ /lb., 17 ϕ , and 21.10 ϕ /lb., respectively. The first two are c.l. prices; the latter, barrel lots.

Supply of red cadmium lithopones grows tighter despite the recent advances (*CW Market Letter*, Aug. 27). Reason, of course, is the continued scarcity of selenium. Only available metal are some odd lots in the resale market, but makers of selenium-containing pigment complain that they can't meet the prices demanded. One report: about \$25/lb. Primary producers' schedules are nearer \$10, including this August's \$3 increase.

Outlook? Darker for red cadmium users.

In another metal derivatives area, buyers of mercurials may be abandoning their hopes for price reductions. Despite the months-long skid in mercury prices—from a high of about \$330/76-lb. flask down to about \$265—prices of mercurials remained relatively high. Reason: much of the latter has been made from high-cost metal.

Now the mercury price curve is turning up again (latest quotes range between \$275-278/flask), and chances are that the uptrending is no fluke; it will continue as long as supply is scarce. Thus, since mercurials stayed high when the metal was low, there's little likelihood that declines will come with mercury inching up again.

SELECTED CHEMICAL MARKET PRICE CHANGES

Week Ending October 3, 1955

UP

Lead pigments:	Change	New Price
Dry red, 95%, bbls., c.l., wks., frt. alld.	\$0.005	\$0.18
Litharge, comml., pdrd., bbls., c.l., wks., frt. alld.	0.005	0.17
Orange mineral, American, bbls., l.c.l., wks.	0.005	0.2110

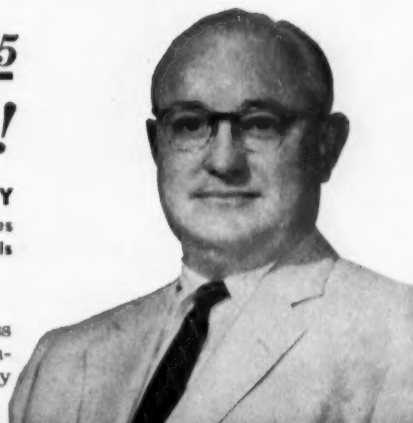
DOWN

Sebacic acid, purif., drms., c.l., wks.	0.05	0.59
Tin metal, Straits	0.00375	0.97

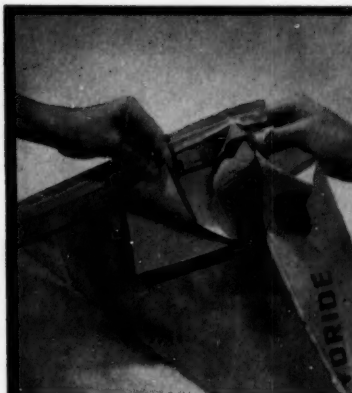
How one firm proved that Fulton's New Sleeve could lick their Sifting Problem...

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BY J. FRANK GREELEY
Director of Multiwall Paper Bag Sales
Fulton Bag & Cotton Mills



They Had to be Shown. Sifting could make a big profit-and-loss difference in this company's operation. Fulton's new Ful-Flex Non-Sifting Sleeve looked different and promised new economies. They tried it out.



Comparison Showed that Fulton's Ful-Flex Sleeve was of extra size, and made of special flexible paper. They tested it thoroughly. First...
Actual case history in our files—name on request.



They Tested for Sifting on the conveyor belt. Careful scrutiny of the floor area underneath showed no significant sifting had developed. What would happen during shipping? They checked...



A Double Check at point of arrival was made. Floor of freight car showed barely perceptible sifting had taken place. Weight test proved sifting loss had been negligible... at a saving of \$2.25 a thousand!



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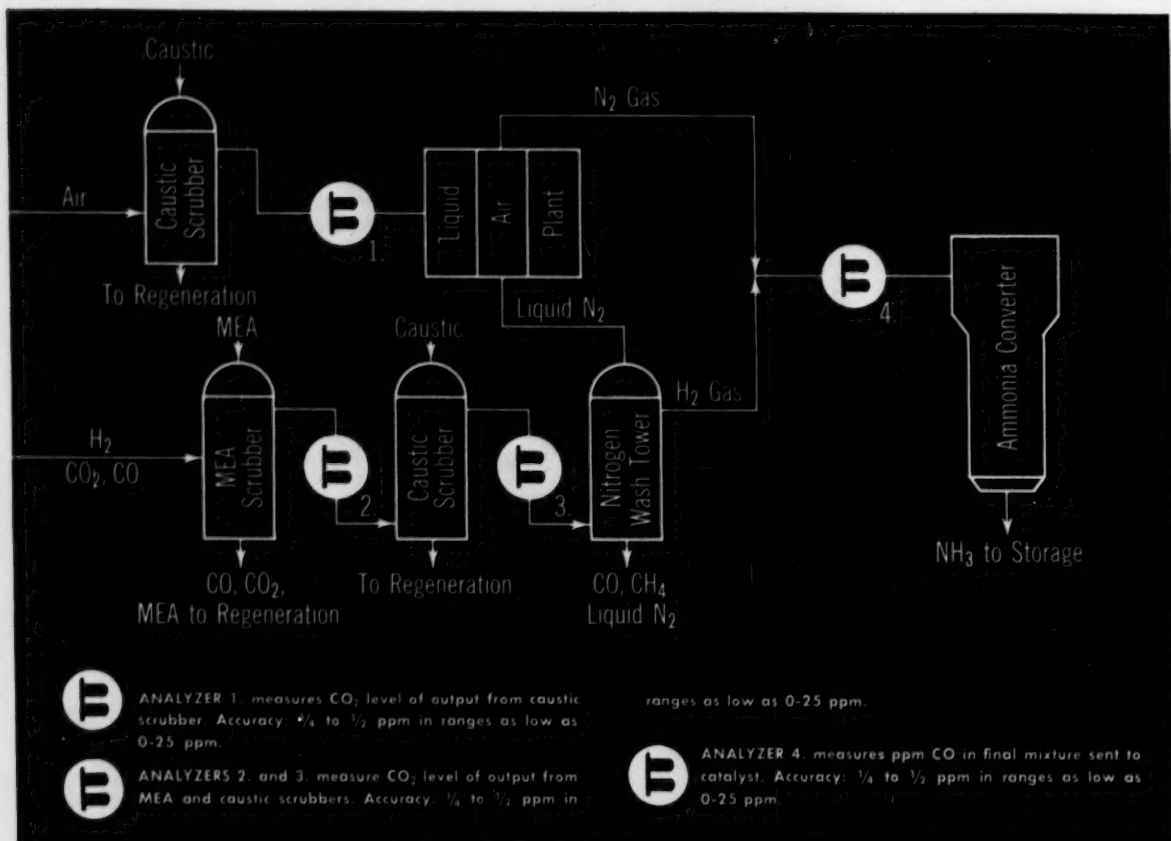
We have a sifting problem in packing _____
(Please feel free to write Fulton full details in complete confidence)

Name _____

Company _____

Address _____

Please write ☐ Have representative call ☐



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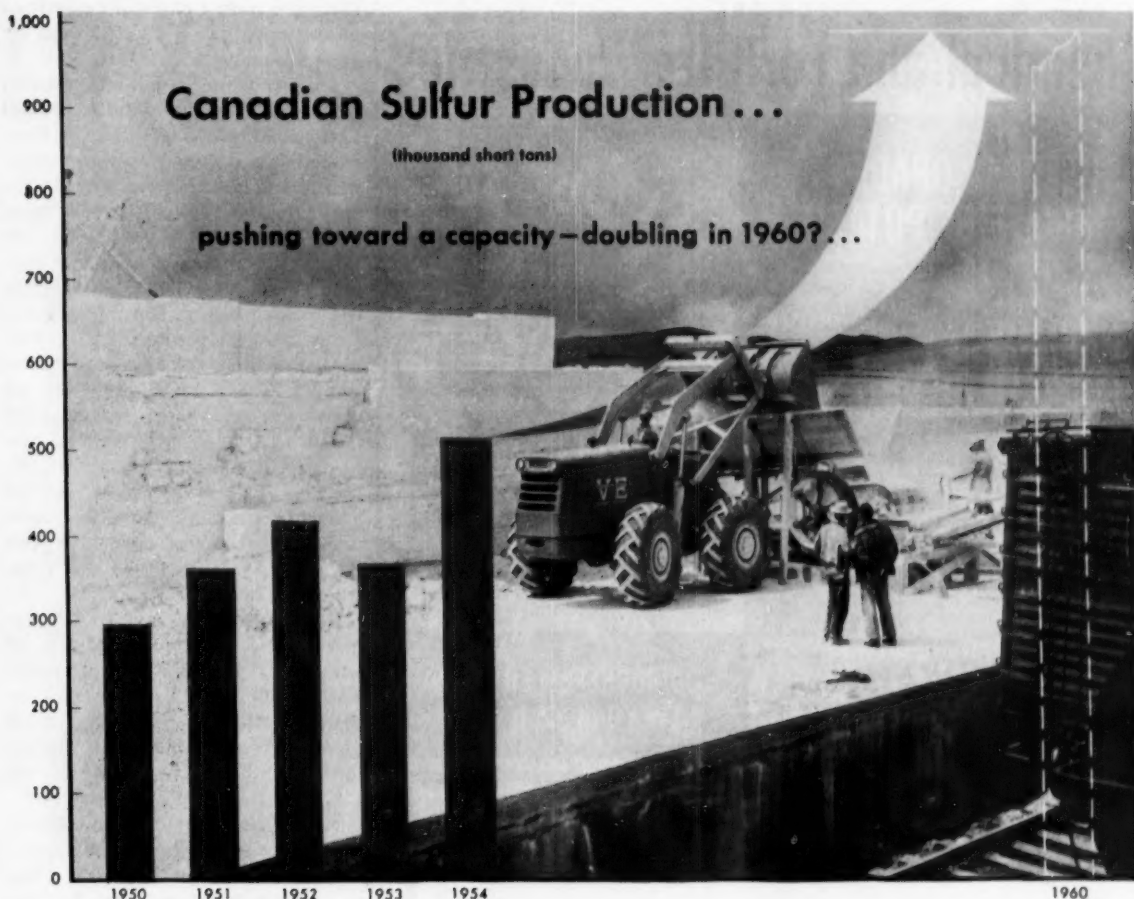
*T. M.



P-E TRI-NON Analyzers are available in a wide range of models and prices to meet all types of continuous analytical problems. They are rugged and dependable, expressly designed for use in the varied environments of a processing plant or refinery. For quick and easy maintenance, instrument components can be tested right on stream — without disconnecting.

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Dilemma: Back Yard Brimstone

Within the next five years now-small sour-gas sulfur output in western Canada may hit an 800,000-ton/year rate, boost total annual sulfur yield past the million-ton mark.

But need exists in the more industrial Eastern section of the country—and transporting costs spell out the Dominion's "too much here—not enough there" sulfur quandary.

Too much—yet not enough—is the paradox that now plagues Canadian sulfur producers. The reason: brimstone will be piling up in an area lacking in sulfur-consuming industries, while established users are too far away to avail themselves of the new supply. But Dominion chemical industry still looks to self-sufficiency in this important raw material, hopes to free itself from the need of imports.

Because Canada has no known natural deposits of elemental sulfur, domestic production has been limited to recovery of sulfur from smelter

gases and pyrite. However, the imminent need of desulfurizing natural gas—before the latter is sent through the proposed trans-Canada pipeline* from Alberta to the east—will result in large stocks of sulfur in the Prairie Provinces.

Shell Oil of Canada, now the nation's largest producer of sulfur from petroleum and natural gas, will extract

* Due to financial and other difficulties, action on the trans-Canada natural gas pipeline was postponed for a year, but the East-West link should be servicing Winnipeg by 1957, point east a little later. Sulfur—present in the form of hydrogen sulfide—must be removed at the source to make the gas salable and to minimize corrosion of the pipeline.

about 18,000 short tons this year following a recent doubling of facilities at Jumping Pond, Alta. In addition, Royalite Oil will produce some 10,000 tons at Turner Valley, Alta.

Although at present the total output of sour-gas sulfur is still small, some Canadian sources estimate that within five years Alberta's capacity will reach 1,000-2,000 s.t./day; also, an additional 150-200 s.t./day will be produced in British Columbia.

This means a potential output of as much as 800,000 tons/year by 1960, in western Canada, and even if sulfur production from smelter gases and pyrites were to remain at the present rate, total annual yields could easily pass the million-ton mark.

Meanwhile, total Canadian sulfur production has been climbing steadily, and even greater advances are foreseen for the years ahead. For example, the

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MARKETS

Dominion output of sulfur equivalents was stepped up to 521,000 tons by 1954, from about 300,000 in '50.

Imports Drop: Meanwhile, imports from the U.S. dropped from 390,000 s.t. in 1950 to 310,000 in 1954. How much the new Western sulfur production will influence the already declining U.S. imports is still a moot question. Some further cutbacks are expected, but it's hard to predict how soon, if ever, the Dominion industries will shift entirely to domestic sources.

As for U.S. producers, their best protection from the competitive pressure of Alberta sulfur are Canadian transportation charges. High rail freight schedules now prevent economical shipment of sulfur from Alberta to Eastern provinces. At the moment there's little hope that these rates can be lowered enough to open the Eastern markets to the new Western sulfur source.

Consequently, Alberta sulfur producers view with optimism signs of industrial expansion in the Canadian wheat belt, hope that other new industries will develop rapidly enough to absorb most, if not all, of the sulfur when it becomes available in large quantities.

Newest customer for Shell sulfur is Inland Chemicals, whose million-dollar, 100-ton/day, sulfuric acid plant at Fort Saskatchewan, Alta., has just been completed by Lummus of Canada. The sulfuric acid will be sold to the nearby Sherritt-Gordon nickel ore processing plant, and to other industrial users in western Canada.

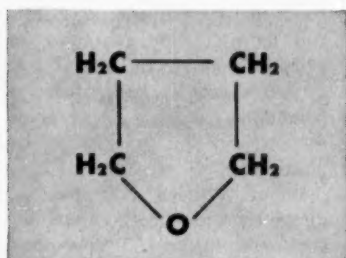
The use of natural gas-derived sulfur in ore treatment will probably increase significantly in the future. Already, Gunnar Mines makes sulfuric acid from it for leaching uranium ores at Lake Athabasca in northern Saskatchewan—reportedly will need 30,000-35,000 tons of sulfur each year for this purpose.

But present and future sulfur markets are not entirely dependent on the metal industry. The British Columbia pulp and paper industry, for example, is a hefty sulfur customer. Too, a possible big future outlet for the sulfur may be in the manufacture of fertilizer—a product that should find a ready market in Western agricultural areas.

U.S. Outlets? A natural question is whether or not the Alberta sulfur will eventually find markets in the U.S.

What's Your "Price I.Q." on These Furan Chemicals from Du Pont?

TETRAHYDROFURAN

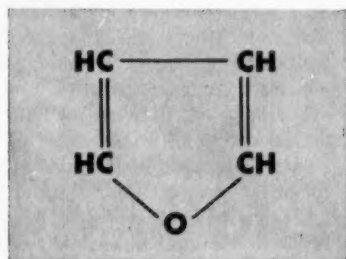


☐ 75¢ lb. TCL ☐ 35¢ lb. TCL ☐ 55¢ lb. TCL

You're right if you checked 35¢ lb.* as the price of this powerful solvent for polyvinyl chlorides. And this same low price warrants investigating tetrahydrofuran as a chemical intermediate, a use of increasing importance today. Tetrahydrofuran is finding increasing use in applying top coats of high molecular weight polyvinyl chlorides to polyvinyl chloride sheeting and supported fabric. THF and mixtures of THF and other solvents commonly used for polyvinyl chlorides can be recovered in standard carbon adsorption units with minor modifications to insure efficient recovery without formation of hazardous peroxides.

For 8-hour daily exposure, it is recommended that the concentrations of THF in air be held below 100 ppm. In this respect, toxicity of tetrahydrofuran is of the same order as that of many commonly used industrial solvents.

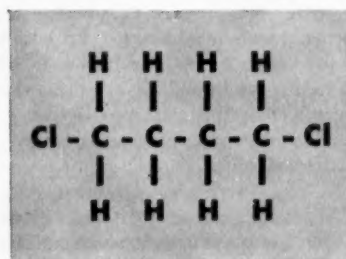
FURAN



☐ 20¢ lb. TCL ☐ 49¢ lb. TCL ☐ 33¢ lb. TCL

You get a perfect score on this part of the quiz if you chose 33¢ lb.* as the price of furan. The furan ring structure appears in many physiologically active, naturally occurring compounds. For this reason, the chief interest in furan has centered on its use as an intermediate in the production of pharmaceuticals and plant growth regulants.

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New booklet gives facts on buying caustic soda

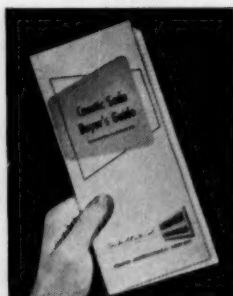
Which strength caustic soda is your better buy—50% or 73%?

This new booklet gives facts about caustic soda that every buyer should know.

It contains a handy nomograph to help you figure for yourself how much you can save by switching from 50% to 73% concentration. There's a factual discussion of the economics of 73% vs. 50%.

The booklet also contains a nomograph for estimating your liquid caustic requirements for various process solution strengths; a table showing dimensions and capacities of the different containers in which Hooker caustic soda is shipped; and a list of points to look for when you're choosing a caustic soda supplier.

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5-1773

MARKETS

Canadian producers believe that an economical shipping radius from Alberta would include points of consumption in this country. But at least one U.S. sulfur expert disagrees, maintains that transportation costs would be too great to permit profitable sales here.

In either case it should be remembered that the Canadian oil companies will be producing sulfur as an inevitable by-product. Thus, if a heavy surplus develops, there is always the possibility that the excess could be dumped on the market at distress prices.

Imports Needed? At present, a real threat by the Alberta operations to imports from the U.S. does not seem imminent, but competition from other sources of Canadian sulfur may exert increasing pressure.

Noranda Mines, for example, last year began commercial production of elemental sulfur from pyrites at Port Robinson, Ont. Actually, the unit is considered a large-scale pilot plant, and further refinements in the process are anticipated. It is designed for an annual output of 18,000 tons of elemental sulfur, and 36,000 tons of sulfur in the form of sulfur dioxide. The latter reportedly is being supplied to North American Cyanamid's nearby sulfuric acid plant; the elemental sulfur is said to be already garnering markets—especially in the pulp and paper industry—that were formerly supplied by U.S. imports.

But because this process is still in the developmental stage, no accurate prediction of its ultimate impact now seems possible. It is doubtful, however, that the need for imports will soon be wholly eliminated by pyrite-derived sulfur.

Too, there are occasional rumors about the possibility of sulfur production from lead and zinc ores, and from anhydrite and gypsum. All of these materials are abundant in Canada. For the present, however, these sources of sulfur are best considered as reserves for the distant future.

Right now, it will be enough of a trick for Canada's sulfur producers to get all the bugs out of the pyrites process, and to find adequate markets for natural gas-derived sulfur. Consequently, this "too much—yet not enough" Canadian sulfur picture is causing little apparent concern among U.S. sulfur producers.

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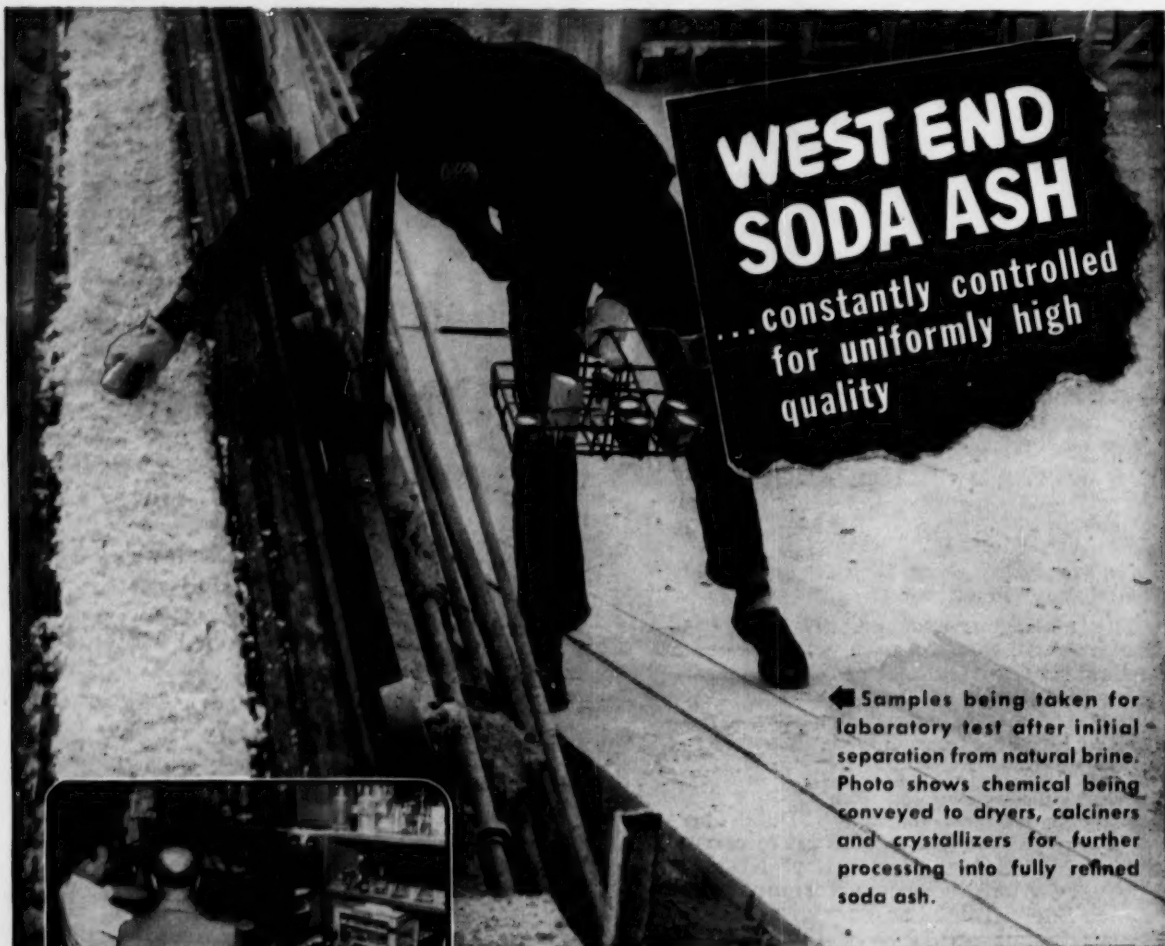
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SODA ASH**
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for uniformly high
quality

◀ Samples being taken for laboratory test after initial separation from natural brine. Photo shows chemical being conveyed to dryers, calciners and crystallizers for further processing into fully refined soda ash.



◀ Many laboratory tests are made of the product during chemical processing from natural brine to finished soda ash.



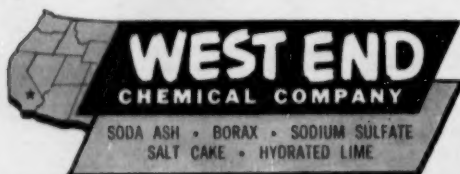
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Technology

Newsletter

CHEMICAL WEEK

OCT. 8, 1955

Soviet-bloc countries appear to be ahead of the U.S. in the race to use radiation in the manufacture of bulk chemicals.

In Washington last week, AEC's Bernard Manowitz (of Brookhaven National Laboratory) told the Atomic Industrial Forum (*see p. 13*) of these developments by scientists behind the Iron Curtain:

- Rumanian chemists have obtained results indicating that irradiation can increase the percentage yield of the gamma isomer of benzene hexachloride. The Rumanians reportedly have screened several methods of producing the insecticide, conclude that a low-temperature (0 C) chlorination using gamma rays will yield the greatest quantity of desired isomer at no appreciable loss in chlorination rate.

- Russian workers claim to have effected a three-fold boost in the yield of phenol produced by the radiation-induced reaction of benzene and water. Addition of ferrous ion and sulfuric acid is reportedly the key to the improvement on American results.

- In much the same manner, Soviet researchers report that they are able to jack up, by a factor of three to five, the radiation-catalyzed output of hydrogen peroxide.

All of this work is believed to be in the laboratory stage of development. But—even though they don't portend imminent plant-scale production of radiation-catalyzed heavy chemicals—these studies highlight a fundamental difference between Soviet and American emphasis: we are mainly investigating radiation in selective chemical chain reactions (e.g., polymer formation); the Soviets are willing to gamble that bulk chemicals can be made economically by radiation techniques if the right yield-boosting sensitizers can be found.

•
Some late news on the sugar-based detergent (*see p. 90*): at this moment, two organizations are in the process of signing licenses with the Sugar Research Foundation—Mexico's Union Nal. de Productores de Azucar S. A. de C.V., which represents the country's sugar producers, and Quin. Ind. Medicinalis S.A. (São Paulo, Brazil). The process is a natural for such countries, which want to make synthetic detergents but are not so well blessed with petrochemical sources as is the U.S.

In this country, the process is being pilot-planted for SRF by Sol Boyk of Ottawa Chemical Co. (Toledo, O.) (*CW*, June 9, '51, p. 25).

•
Neatest trick in many weeks is revealed in a new patent (U.S. 2,718,529) granted to Shell. It describes a method of hydroxylating unsaturated aldehydes with hydrogen peroxide using osmium tetroxide as a catalyst. This, of course, would fit right in with Shell's new synthetic glycerine process based on acrolein and hydrogen peroxide (*CW*, May 7, '55, p. 72).

By careful control of the ratio of catalyst to peroxide, for example, Shell can react acrolein and hydrogen peroxide to form glyceraldehyde, which is hydrogenated to glycerine. Glycerine yields by the method, based on the acrolein and hydrogen peroxide used, run about 78%.

On paper, the reaction looks easy. You have to remember, however, that to get to glycerine from acrolein, you have to reduce one functional group (the aldehyde) and oxidize the other (the carbon-carbon double bond).

And though the process is quite a research accomplishment, its com-

Technology Newsletter

(Continued)

mercial significance is questionable: the catalyst is expensive and the technique is tricky.

More likely, Shell's commercial route will depend on the opposite approach: reducing the aldehyde group first and then hydroxylating across the double bond. For instance, by reacting an alcohol (like isopropanol) with acrolein, it could get allyl alcohol and an aldehyde or ketone (like acetone). The allyl alcohol could then be reacted with peroxide to produce glycerine. Shell, in fact, received a British patent (619,014) on just such a process several years ago (*CI Newsletter*, Nov. '49). Because the method calls for a more conventional catalyst (e.g., magnesium oxide) and employs more-familiar oxidation techniques and because the materials (e.g., isopropanol) and coproducts (e.g., acetone) dovetail with Shell's present interests, this latter approach is a better bet for Shell's commercial production.

Another neat trick is a new form of vitamin A palmitate being introduced by Chas. Pfizer this week. This one, however, is already commercial. Designed to make the product more stable in necessarily acidic aqueous dispersions, the new form climaxes two years of study.

The key: the all-trans isomer of vitamin A, the highly active form, isomerizes in an acid medium into a less active cis form. To prevent this loss of potency, Pfizer deliberately converts a portion of the all-trans isomer to cis, turns out an equilibrium mixture that won't lose its biological activity so easily.

Late developments are rekindling speculation about the future of American Cyanamid's embryo acrylic fiber.

In a statement to *CW* last week, the firm described as "extremely encouraging" the results of its more-than-a-year-old program of wear-testing and fiber evaluation. It avers that the fiber under test is substantially different from the original experimental model (X-51) in "ease and uniformity with which it can be dyed—alone or in combination with wool."

By itself this report is of limited significance.

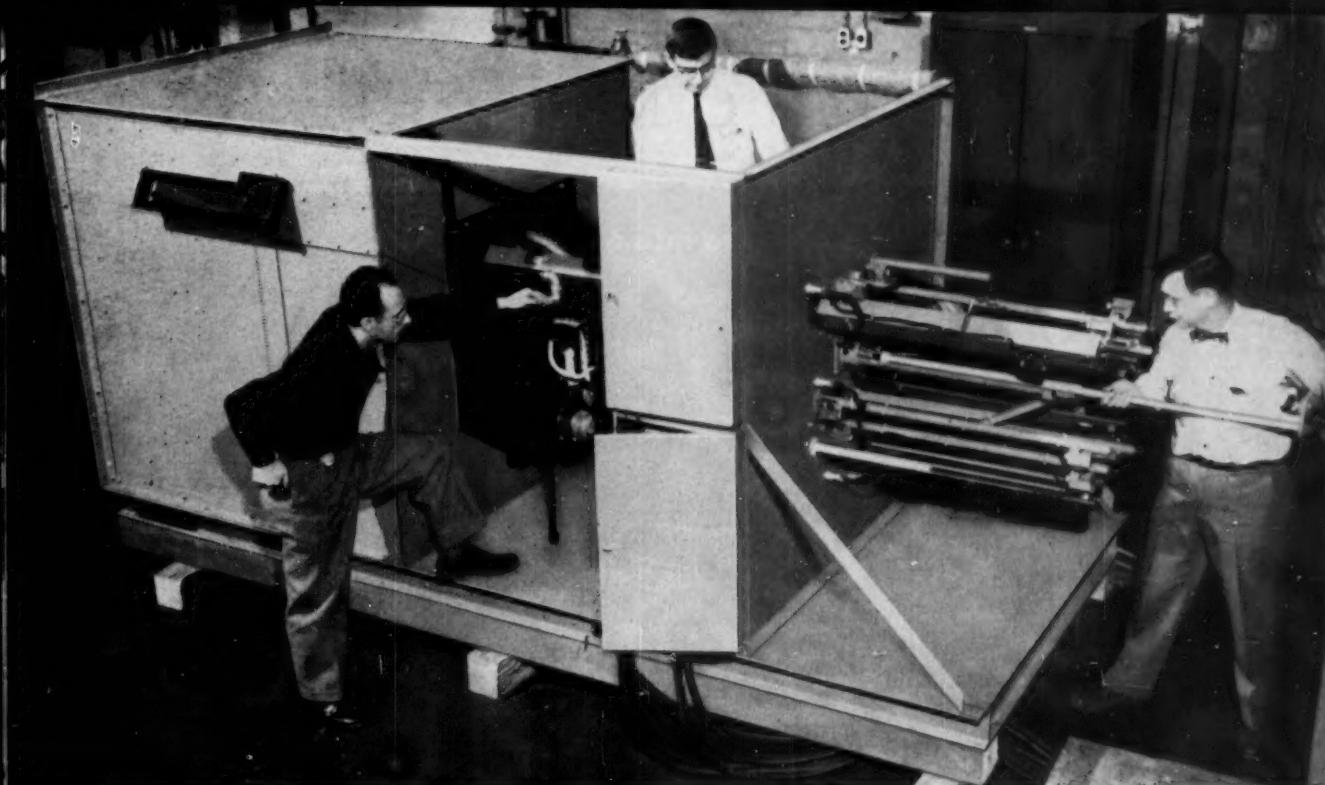
But don't forget that Cyanamid recently dropped the fiber's experimental tag (X-54) in favor of the more commercial-sounding Creslan. The logical question: Has X-54's—or more accurately, Creslan's—time arrived?

The company says no—the decision to go commercial has not yet been made. It points out that wear-testing of Creslan garments continues; still under development are pile fabrics made of staple; and a filament-development program is unfinished.

It's equally true, however, that Cyanamid is looking at plant sites in Southern textile mill country. And at least one location, below Columbia, S. C., is getting careful consideration.

All this, of course, doesn't prove that Creslan is market-bound. But you would be hard put this week to find a fiber expert willing to wager that it isn't.

Dow this week proudly announced its first shipment of soda ash by a "new process." Although the firm won't talk about it, the process involves the carbonation of dilute caustic cell liquor. Carbonation source is probably flue gas, which it has available in quantity.



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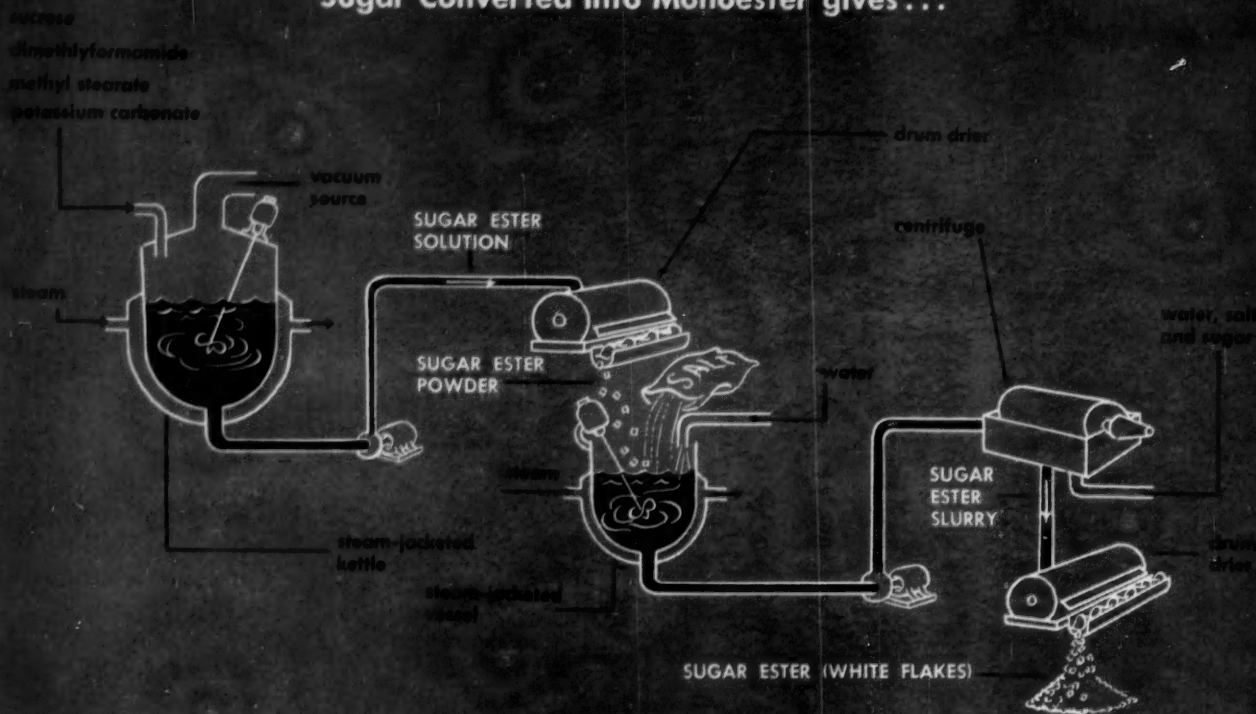
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Sugar Converted into Monoester gives . . .



Low-Cost Detergent, Promising Process

The process of making a detergent from sugar is shedding its swaddling clothes, is now ready for commercialization.

Costs appear favorable. One estimate: it can be made for 13¢/lb., sold at 19¢/lb.

The technique itself is a potentially significant tool. It might also be used to make drying oils and polymers from sugar.

Next week in Philadelphia at the meeting of the American Oil Chemists' Society, Foster D. Snell will unveil the commercial process of making a detergent from sugar. In New York city, in Snell's labs, Lloyd Osipow, the researcher who developed the product, and who has been carefully nursing it along, will—with his associates William York and Arthur Fincher—continue to polish the process. All over the country, soap men will be slipping their slide rules, measuring the economics of the process and sizing up the market potential.

For the sugar-based detergent has

caught the fancy of industry. At last count, 74 firms had paid the nominal fee to receive reports on Osipow's work, many times that number of requests have been received for samples of the product.

The reason for their interest is not hard to find, of course. The product is a nonionic detergent that's nontoxic, odorless and tasteless. It gives low to moderate foam (depending on the builders used and the fatty acid ester that's reacted with the sucrose). And though most nonionics are liquids, the sugar-based ester is produced as a free-flowing powder. In short, says Osipow,

it seems well suited for work as a heavy-duty detergent. Topping off its list of qualifications, it's made from cheap and plentiful sucrose and fatty acid esters.

Spurred by SRF: Getting a special glow from all the interest in the sugar-based detergent, of course, is Henry Haas, president of the Sugar Research Foundation, which is picking up the tab for the research done at Snell. As long as a year ago (*CW*, Sept. 11, '54, p. 49), both Haas and Osipow knew that the monoesters of sucrose showed promise as a detergent. But the process they were working on (reacting sucrose with tallow) left something to be desired. Conversion of the sugar was only fair (about 50%).

The present process, on the other hand, gives good conversions (over 90%). The secret, Osipow found, was to react the sucrose with the fatty acid ester of a volatile alcohol in a solvent. An excess of the sucrose produces the

monoester, desired for detergent uses. An excess of the nonsugar ester produces the diester, which also may find jobs (as a food emulsifier, for instance).

This is how sucrose monostearate is produced in a typical run:

Three moles of sucrose, one mole of methyl stearate and 0.1 mole of potassium carbonate (catalyst) are dissolved in dimethylformamide (or dimethyl sulfoxide). The potassium carbonate is a preferred catalyst because, unlike a more alkaline catalyst (e.g., sodium methoxide), it will not take part in undesirable side reactions at high temperatures.

The reaction mixture is agitated, heated at 90-95 C at 80-100 mm. of mercury for 9-12 hours. The methyl stearate reacts with the sucrose to give the sucrose monostearate and methanol. The latter is stripped off.

After the solvent is distilled off and the product dried, it contains about 45% monostearate, 1-2% potassium carbonate and about 54% unconverted sugar (because of the large excess used). The product can be used for many jobs, as is. More likely, however, is that the economics of the situation will dictate that the sugar be recovered by further purification of the product.

In that case, it can be dissolved in three or four times its weight of water and mixed with salt. It's then heated to 80-90 C until the sugar ester has layered completely. Finally, the slurry is centrifuged to remove water, sugar and salt and the product is dried again.

If the diester rather than the monoester is desired, it can be made by using two moles of the stearate for each mole of sucrose. Then, after the solvent is removed, the product runs over 90% sucrose distearate, contains less than 1% unreacted sugar. Thus, the need for additional purification is not necessary.

Paints and Plastics? Though no one is yet using the process commercially, it's being put through its paces in the pilot plant and Osipow feels it's ready for a commercial plant right now. By the same token, he intends to continue working on it for another six months, expects that it will be considerably improved by that time.

Because the process is so new, cost figures are hard to pinpoint. But one producer has estimated the works cost at 13¢/lb., feels the product should command a price of around 18¢/lb. Licensing will be done by the Sugar Research Foundation, which will charge a royalty of 2% of sales. (Money collected in this way will be

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LOS ANGELES, CAL.

plowed back into other projects aimed at furthering the industrial utilization of sugar.)

But even before he's finished with the detergent process, Osipow is looking forward to other applications for the technique. By using an ester of linseed oil and reacting it with sucrose, for instance, you can get a drying oil. Or, by using a dibasic acid, you can form a sugar polymer that might be suitable for either plastics or fibers.

In fact, both he and Haas are out to keep sugar busy.

Placid Meeting

Swarms of chemical engineers armed with golf clubs assaulted the greens and fairways of the bucolic Lake Placid Club, took scenic trips to view the changing fall foliage and still found ample time to discuss the problems of building and running chemical plants. It was the National Convention of the American Institute of Chemical Engineers held at Lake Placid in the Adirondacks last week.

Actually, it was pretty much of a management meeting. For example, the highpoint of the gathering for many attenders was the talk (at the banquet) Monday evening by General Electric's Harold Smiddy, who gave a rundown of GE's program for developing professional managers.

Other highpoints of the meeting dealt with the atomic energy program. B. V. Coplan and J. K. Davidson of GE's Knolls Lab, for instance, made the point that the fertile area for development in the atomic energy field is in the design of the plant and its auxiliaries. They report that at present 50% of the processing cost is in that area. And though reprocessing of spent fuel is presently less economical than discarding it, efficient processing can make atomic power economic and create a new chemical process industry as well.

George White, vice-president of Vitro Corp., spelled out the interrelationship of the nuclear reactor economics with the economics of reprocessing fuel elements.

Mathew Braidech, director of research for the National Board of Fire Underwriters, dealt with the special problems of engineers and insurance men entailed by the expanding atomic energy program.

EQUIPMENT

Solids Transport: The Allen-Sherman-Hoff Co. (Wynnewood, Pa.) is out with its new line of Hydro-Ejector jet pumps for moving solids through pipelines. Jet nozzle tip is located out of the path of material flow to minimize wear, promote free flow of solids. Use of wear-resistant materials and few internal connecting joints, says A-S-H, makes the pumps trouble-free, easy to maintain. Four sizes, for

4- to 10-in. transport pipelines, are available.

Corrosion Warning: Advance notice that hydrogen blisters are corroding the metal walls of pressurized reaction vessels can prevent disastrous blow-outs. Texstream Corp. (Houston, Tex.) has developed a hydrogen probe that detects an unsafe condition, gives early warning indication on a pressure gauge. Probes come in 18-, 24- and 36-in. lengths, can be removed or



Air Goes In, Fire Goes Out

JUST 22 SECONDS after compressed air was turned on (above), this creosote oil fire at Koppers Co.'s Kobuta plant was out. The flames were literally drowned out by rapidly circulating cool liquid from the bottom of the tank. The demonstration climaxed a two-year study of controlling coal chemical fires by the method developed at Socony-Vacuum Oil Co. (CW,

Dec. 6, '52, p. 50) for combating petroleum blazes. Other tests demonstrated the effectiveness of agitated cooling by compressed air and nitrogen, and by forced recirculation of the liquid itself through a bottom-mounted jet. The system also afforded good control, if not total extinguishment, of flames in smaller tanks of more-volatile chemicals.

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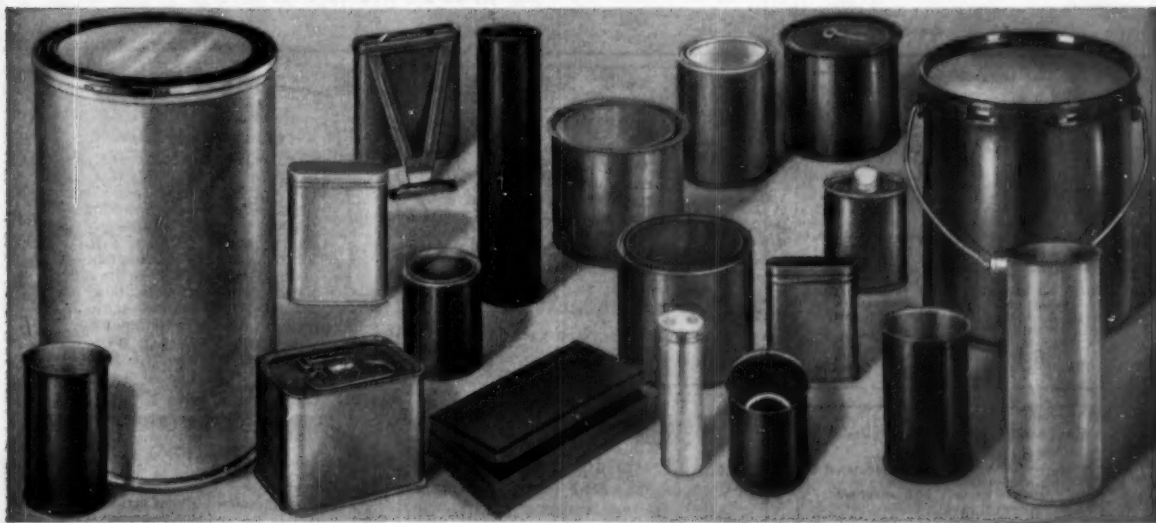
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P 7893 Chemical Week
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To conduct original research or development work on methods of producing, modifying, stabilizing and evaluating polymers. Excellent laboratory facilities and growth potential in a new plant of a nationally known company located in central Illinois. Kindly submit details of qualifications.

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Young chemical engineer with a flair for economic studies needed by a growth-minded eastern chemical company offering unusually attractive working and living conditions. This man will work on an expanding team reporting directly to top management. Some plant experience desirable, chemical engineering degree essential. Replies held in confidence. Send resumé, including salary history, to

P-7850 CHEMICAL WEEK
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Leading raw materials manufacturer desires experienced tile chemist for research and development work on resins and softeners of use in asphalt, vinyl, and rubber floor tiles. Send complete educational and industrial experience with salary requirements. All replies confidential. Our personnel knows of this ad.

P-7783—Chemical Week
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P-7764 CHEMICAL WEEK
330 W. 42 St., New York 36, N.Y.

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Top company in the plastics field has openings for experienced men, 27 to 40 years of age. Candidates should have a technical degree, a preference for sales, and be willing to travel. Experience and contacts in the textile field desirable. Submit resume giving complete details including salary desired.

P-7765—Chemical Week
330 W. 42nd St., N. Y. 36, N. Y.

WANTED

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Manufacturer calendered film and vinyl sheeting requires experienced chemical engineer or chemist. All replies confidential. Reply

P-7322 CHEMICAL WEEK
330 W. 42nd St., New York 36, N. Y.

chemical process industries

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Well established company seeks representative experienced selling chemicals to food and industrial manufacturers. Excellent prospects to become Sales Manager NYC area. Age 30-35. Chemical degree preferred. Starting salary abt \$8,000. Please send complete resume including education, experience & earnings in confidence.

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P-7325 CHEMICAL WEEK
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Niagara Pressure Leaf Filter #110-20, stainless steel, 110 sq. ft., Perry Equip., 1415 N. 6th St. Phila. 22, Pa.

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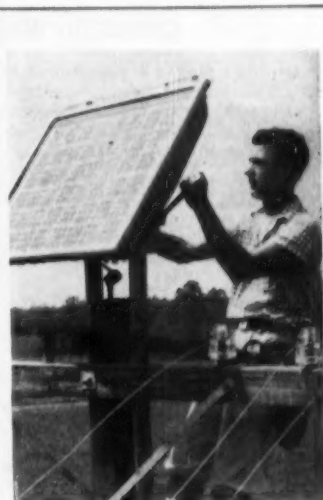
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BO-7910 CHEMICAL WEEK
520 No. Michigan Ave.,
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PRODUCTION

replaced in flanged, threaded or pressure-lubricated mountings while the vessel is under pressure.

Closed-Loop Control: Its Pneumatic level control, says Fielden Instrument Division of Robertshaw-Fulton Controls Co. (Philadelphia), combines the best features of both electronic and air-pressure control. Electronic signals from capacitance sensing elements are converted into proportional pneumatic outputs sufficiently powerful to operate control equipment. Applicable to a wide variety of processing equipment and materials, the device minimizes "on-off" wear, eliminates servo motors and other troublesome rebalance mechanisms.



Pole-Mounted Power

WRONG NUMBERS may by the unknowledgeable be blamed on sun spots, now that Southern Bell Telephone Co. is using the Bell solar battery to power a new type of rural system near Americus, Ga. The device uses 432 wafer-thin silicon disks to generate 100 watts/sq. yd. of effective surface, is said to be at least 15 times more efficient than previous solar energy converters. Electric current in excess of that required to operate the transistorized system is fed to storage batteries, provides power at night and during bad weather.

Freeze-Dryers: Naresco Equipment Corp. (Newton Highlands, Mass.) has just brought out three new freeze-drying units that, it says, are designed primarily for operator convenience. The units provide drying capacities of 800-6,000 ml. of water, are suitable for many heat-sensitive-material applications from laboratory work to limited-scale production.

Micro Viscometry: The National Bureau of Standards has developed a semimicro dilution viscometer for polymer work where only small samples (approximately 1 ml.) are available. The instrument eliminates errors resulting from solvent evapo-

ration, permits making reruns with a single sample by direct addition of diluent. Its accuracy is such, says NBS, that molecular weight determinations are practically free of the systematic errors common to viscometry.

Breaker Teeth: To simplify replacement of worn teeth on bale breakers, Taylor, Stiles & Co. (Riegelsville, N.J.) now equips breaker cylinders with tapered sockets. Teeth are tightened by normal rotation of the cylinder, can be easily driven out of the socket when worn.

Power Saver: The high-pressure, reciprocating-plunger pumps, which

Philadelphia Pump & Machinery Co. (Philadelphia) just added to its standard line, use 30% less horsepower than other similar types that develop pressures to 50,000 psi. They're the controlled-capacity type, suitable for metering outputs from 2 cc. to 15,000 gal./hour, in simplex, duplex, triplex and quadruplex models.

Gamma Ray Camera: M. W. Kellogg Co. (New York) now offers Kel-Ray portable gamma-ray projectors for industrial radiography. Units use radio-isotopes, cost only a fraction as much as comparable X-ray equipment. Other features: 360° picture angle, supersafe shielding.

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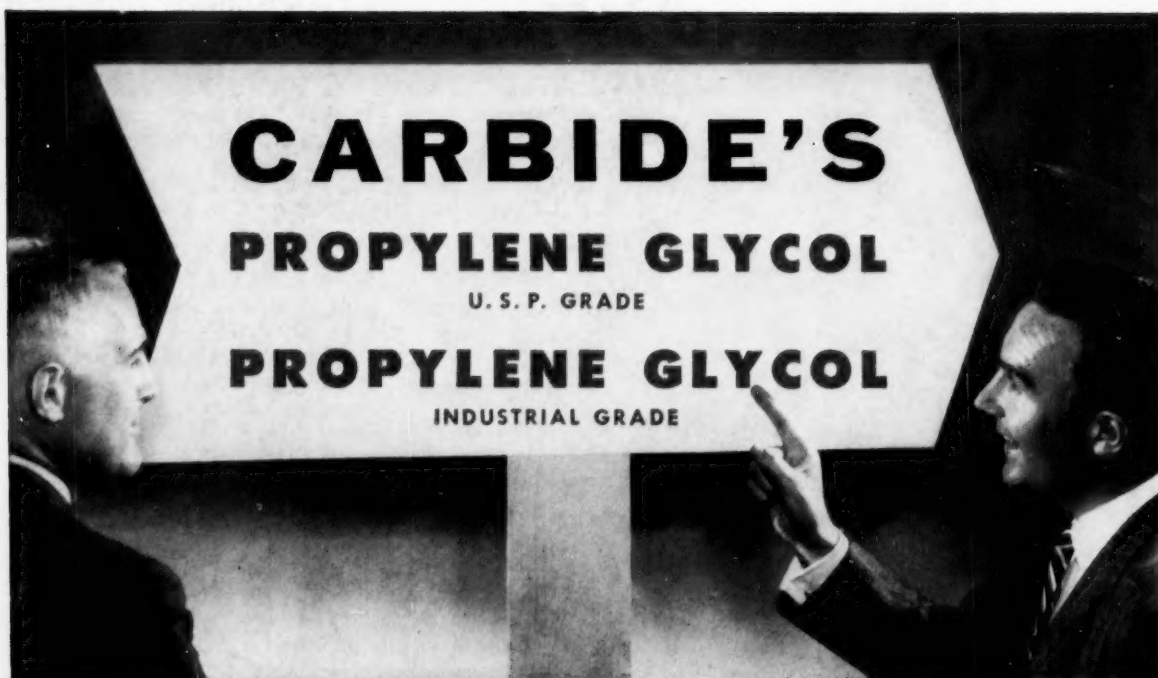
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